LIBRARY
OF THE
UNIVERSITY OF CALIFORNIA.
RECEIVED BY EXCHANGE
Class

Publications
OF THE
University of Pennsylvania

SERIES IN
Political Economy and Public Law

No. 22

THE ECONOMIC HISTORY
OF THE
ANTHRACITE-TIDEWATER CANALS

BY

CHESTER LLOYD JONES
Instructor in Political Science, University of Pennsylvania

LIBRARY
OF THE
UNIVERSITY
OF
CALIFORNIA

Published for the University
PHILADELPHIA
1908

THE JOHN C. WINSTON CO., Selling Agents
1006-16 Arch Street, Philadelphia, Pa

Publications
OF THE
University of Pennsylvania

SERIES IN

Political Economy and Public Law

No. 22

THE ECONOMIC HISTORY
OF THE
ANTHRACITE-TIDEWATER CANALS

BY

CHESTER LLOYD JONES
Instructor in Political Science, University of Pennsylvania

Published for the University
PHILADELPHIA
1908

The John C. Winston Co., Selling Agents
1006–16 Arch Street, Philadelphia, Pa.

H31
.P4
no. 22

Digitized by the Internet Archive
in 2008 with funding from
Microsoft Corporation

http://www.archive.org/details/economichistoryo00jonerich

TO

ENOS LLOYD JONES

AND

ELEANOR LLOYD JONES

CONTENTS

CHAPTER I.

PAGE
Beginning of the Use of Anthracite........... 1

CHAPTER II.

The Lehigh Canal............................... 7

CHAPTER III.

The Delaware Division Canal.................. 60

CHAPTER IV.

The Delaware and Hudson Canal............... 74

CHAPTER V.

The Morris Canal............................. 104

CHAPTER VI.

The Schuylkill Navigation.................. 126

CHAPTER VII.

Summary 159

Bibliographical Note......................... 166

Bibliography 169

Chapter I.

BEGINNING OF THE USE OF ANTHRACITE.

The existence of anthracite in Pennsylvania was known for fifty years before it became an article with an established market. This was due to two causes—the inaccessibility of the regions where the coal was found and to a lesser degree to the prejudice against it on account of the difficulty of ignition. Liverpool and Richmond coals could easily be brought to the wharves of the tidewater towns and the public, accustomed to their use, was not to be satisfied with the anthracite, which was considered of inferior quality.

The early use of anthracite was, therefore, confined chiefly to the local consumption in interior towns where other coal was not to be had. It came into use chiefly in the forges of the country blacksmiths. In each of the three anthracite coal fields this use had developed before attempts were made to take the coal to the seaboard cities.

The first appreciation of the value of the product occurred in the third or northern field. Here Obediah Gore, a blacksmith immigrant from Connecticut who had settled in the Wyoming Valley, succeeded as early as 1768 in using the anthracite from a local mine in his forge, and it soon became the only fuel used by the blacksmiths in the valley. Coal from this region, in one case at least, burned in the forges that made arms for the colonial levies in the Revolution, for we read, "In the years 1775 and 1776 several boatloads of coal were taken down the Susquehanna and hauled to the United States armory at Carlisle for the manufacture of arms." This coal was taken from a mine belonging "to the late Judge Hollenbeck," about one mile from Wilkesbarre, "near the mouth of his mill creek."

As the trade grew rough arks were loaded with about sixty tons and floated down the north branch of the Susquehanna River, when conditions were favorable, to be sold at the different towns along the route.[1]

The first use of the anthracite for general heating purposes is said to have been made by Judge Jesse Fell, of Wilkesbarre, who in 1808 found that it could be successfully used for a grate fire. This was the region to which an outlet to tide was given in 1829 by the Delaware and Hudson Canal.[2] By that time the virtues of anthracite had become more widely known, and it was being hauled eighty miles from Wilkesbarre into New York State, where it sold for $16 a ton.

In the next field to be opened, the third or southern one—coal was known to abound in the vicinity of the present city of Pottsville[3] and at Mauch Chunk "as early as 1790 and perhaps before." A hunter is said to have discovered the coal first at the place which later became the Old Summit Mauch Chunk mine. He reported it to Mr. Jacob Weiss, who formed a company chiefly of citizens of Philadelphia. This company opened the mine and some coal was taken to the city, but the cheapness of the Liverpool and Richmond coal made the venture unprofitable.[3a] "It was used to a very limited extent by some of the blacksmiths in the neighborhood, but it was considered of little value and excited little attention."[4]

Those who were interested in developing a market on the seaboard were regarded by the public as "visionary enthusiasts."[5] In 1812 Colonel George Shoemaker loaded nine wagons with coal from the Schuylkill mines and hauled it to Philadelphia, 106 miles, where he sold two loads, for the cost of transportation, to a firm who promised to try it in their rolling mill. The rest he gave away, "and had some difficulty in finding persons willing to take it."

---

[1] Report to the Senate, Packer, Chairman, 1834.

[2] For the efforts of the Delaware and Hudson Company to introduce into New York City the use of coal for steam vessels, see Reports of the Company, 1828 *et seq.*

[3] Report to Senate, p. 7.

[3a] Memoir of Josiah White, p. 36 *et seq.*

[4] Report to the Senate, pp. 7 and 8.

[5] Report to the Senate, p. 8.

The next effort to introduce the coal to a general market was brought about by the high prices attendant on the War of 1812. The British cruisers along the coast cut off the supply of coal from Richmond, and shipments from Liverpool were likewise at an end. By this time the practicability of burning anthracite in grates was clearly proven, and it was extensively used in the vicinity of Wilkesbarre. Under these conditions, three citizens of that town, Charles Miner, Jacob Cist and a Mr. Robinson, determined to make another effort to introduce the use of the coal. Toward the close of 1813 they visited the mines and being satisfied that shipments could be made at a profit they got a lease from the old company formed by Weiss almost twenty years before. They received permission to take what coal they wished with the timber needed for arks provided they would market a certain amount yearly.

The first ark was sent down on the ninth of August, 1814. It was 65 feet long, 14 feet wide and held 24 tons of coal. At Philadelphia the coal had cost the shippers $14 a ton. Even under the pressure of the high prices then ruling, it was difficult to find a market. Handbills were published in both English and German stating how to use the coal in grates, smiths' fires and stoves. Cist and Miner went together to various houses in Philadelphia and persuaded the owners to let them show how it should be used. A model stove was designed especially for anthracite by Cist, and a number of such were cast. Blacksmiths were persuaded to alter their forges to accommodate the new fuel, but the journeymen were sometimes so prejudiced that they had to be bribed before they would give it a fair trial.

Even these efforts would probably have failed had not other coal and charcoal risen to prohibitive prices. Then the anthracite began to sell. Other arks were sent down, though a large proportion were wrecked on the way. Those in the enterprise were learning that eight to ten ton loads were the safest and were just beginning to see the possibility of a large trade when "peace came and found (them) in the midst of the enterprise."[6] That killed the market, as Liverpool and Richmond coal could again be brought in at less than the price of transportation from the Lehigh.

Among those who had made a trial of the hard coal in this period, however, was one Josiah White, then engaged in the manufacturing of iron at the Falls of the Schuylkill. By his enterprise the marketing of coal by the Lehigh route was finally to be brought to success. At the other end of the field also a movement was about to start which was to open a market from that district. This was the Schuylkill Navigation, begun in 1815—not originally to carry coal, though that soon became the chief item of its traffic.

The second or middle coal field was the last to receive attention. A railroad to give an outlet to this region was projected in 1826. Stephen Girard was one of those chiefly interested in it and subscribed $200,000 to its stock. It was to connect Pottsville, on the Schuylkill Navigation, with the Susquehanna, at Danville and the Pennsylvania canal basin at Sunbury. Even as late as 1834, however, this region was practically untouched, especially in the western part. On the east the Lehigh Navigation furnished an outlet, but through its high charges it was claimed was definitely trying to stop the development of the resources there.

The problem of furnishing an outlet to these three regions was the one undertaken by the three navigation companies depending on the waters of the Lehigh-Delaware, the Delaware and Hudson, and the Schuylkill rivers. This latter company originally had the general agricultural and timber trade as its main object, the others were from the first distinctly planned for the development of the coal trade. The districts passed through were, in the case of the Schuylkill Canal, already promising agricultural communities. The other waterways led out into the wilderness where there was as yet but a sparse population living on the scanty agricultural resources offered by the mountainous neighborhoods. The activities they fostered were to completely change the character of the tributary regions so that the Senate Committee reporting on the coal trade could boast in 1834:[7] "The coal trade of Pennsylvania recently and suddenly starting into existence now constitutes one of the main branches of our domestic industry and an important portion of the commerce of the state. . . . It has raised up in our formerly barren and uninhabited districts an intelligent and permanent population and converted the mountains into theatres of busy life and our hiterto waste and valueless lands into sites for flourishing and populous villages."

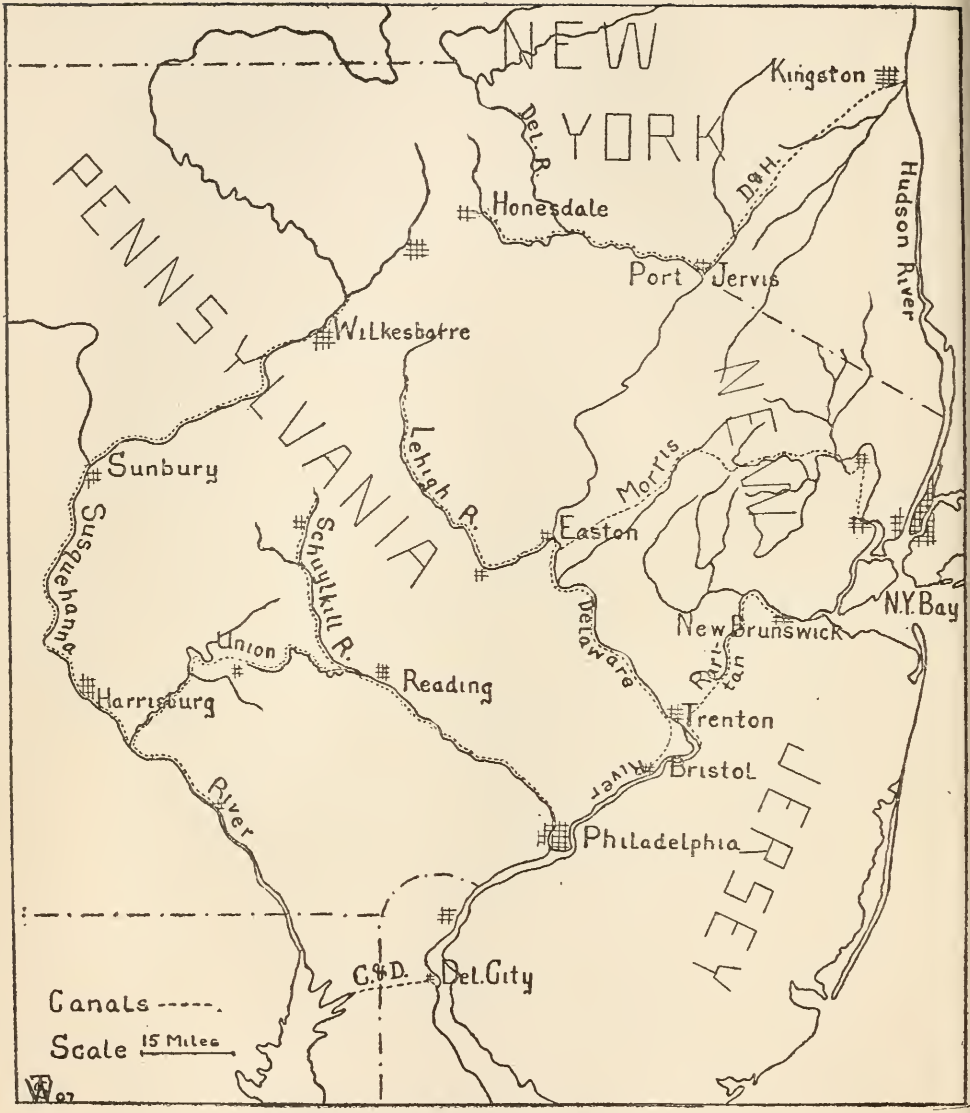
---

[6] Report to the Senate, p. 95, in a letter from Mr. Charles Miner. For further description of the difficulties of introduction see Memoir of Josiah White, p. 31.

Besides these canals penetrating into the heart of the coal region there were two others supplemental to the Lehigh Navigation. These were the Morris Canal, built in the belief that it would gain a practical monopoly of the through coal trade to New York, and the Delaware Division, constructed by the state to improve the Delaware River and give to the northeastern counties, and especially to the trade by the Lehigh Canal an easy access to the Philadelphia market. This group of five canals forms thus a fairly compact system, the main service of which was to supply the two great seaboard cities with anthracite coal.

---

[7] Report to the Senate, 1834, p. 3.



Map of Susquehanna and Anthracite-Tidewater Canals

CHAPTER II.

THE LEHIGH CANAL.

Movements for improving the Lehigh began practically with the settlement of the country which it drained. The river was declared a public highway as early as the ninth of March, 1771. Private subscriptions were made early to improve it and in the act declaring the river a highway a commission was appointed by the Legislature to superintend the spending of the money. What amount had been subscribed is not known. By another act, dated April 15, 1791, the Legislature appropriated "one thousand pounds" to improve the Lehigh from the mouth up as far as the money would pay for the work. This move also appears to have been fruitless. Next came a number of unsuccessful attempts in connection with the coal interests which were finally to bring the completion of the project.

LEHIGH COAL AND NAVIGATION COMPANY.

The Lehigh Coal and Navigation Company was the outgrowth of a number of unsuccessful attempts to introduce the use of anthracite coal, especially into the markets of Philadelphia. It traces its origin from 1793, when a company was formed under the title of "The Lehigh Coal Mine Company," which purchased the tract of land upon which the important Summit Hill mines are located from the then owner, a certain Jacob Weiss. Afterwards this company took up extensive tracts under warrants from the state, thus obtaining about 10,000 acres of land. The coal mine company, though almost without resources and with little public confidence, opened the mines and made an appropriation of ten pounds to construct a road from the mines to the landings on the river, a distance of nine miles. Needless to say, such an appropriation made possible only a nominal road over the very rocky country it traversed. Further, the Lehigh River was by no means an efficient means of transportation. In dry seasons so little water flowed down its rocky bed as to make it impossible to descend it even in a canoe. The company made many futile efforts to get coal to the river over the "road," and after repeatedly calling in vain upon the stockholders for contributions to improve the navigation became discouraged and dropped from sight for several years. On February 27, 1798, another company was incorporated to improve the river and a lottery was established to aid it, but the plan came to nothing.[1] In December, 1807, "to encourage and bring into notice the use of their coal" . . . the coal company gave a lease upon one of the coal veins to Messrs. Rowland and Butland for twenty-one years. These men were to have the privilege of digging iron ore and coal gratis for the manufacture of iron. Their enterprise also proved a failure and the mines were again abandoned.

In December, 1813, a third group of men, Miner, Cist and Robinson, took up the work under a ten-year lease. The coal mine company granted them the right of cutting timber for building boats in which to bring down the coal. The only consideration for the lease was that the operators were to deliver to the market annually for their own profit ten thousand bushels of coal.

From the landing at Mauch Çhunk these men succeeeded in sending down the river five arkloads of coal. Three were wrecked in the passage, but the others reached dock safely in Philadelphia.[2] To get the coal to the landing had cost four dollars per ton, and even at that price the contractor who did the work had lost money. The greater part of the coal that arrived safely at Philadelphia was sold at $21 per ton, but even this high price did not make up the losses incurred and the high expenses of mining and transportation, and this company, like its predecessors, gave up the business. In 1817 the state tried to revive the company for river improvement, mentioned above, by offering to subscribe for 600 shares of the stock when individuals should have subscribed an equal amount. Nothing came of the plan.[3]

---

[1] Report of the Committee of the Senate, 1834, p. 16.

[2] Hazard Pamphlet, see below. Also Report of the Committee of the Senate, 1834.

The chief buyers of the last lot of coal sent down by Cist and Miner were Messrs. Josiah White and Erskine Hazard, then engaged in manufacturing wire at the Falls of the Schuylkill. These men now took up the project of getting a regular supply of anthracite coal for their works from the Lehigh region, whence they were convinced it could be procured more cheaply than from the Schuylkill region. In December, 1817, it was decided that Josiah White should visit the Lehigh mines and river to make an investigation. On this trip he was accompanied by George F. A. Hauto, later a partner with White and Hazard. Returning, they found the lease on the mining property forfeited by non-user and the owners—the Lehigh Coal Mine Company—completely dispirited by the repeated failures in their attempts to open up their properties. From them Messrs. White, Hauto and Hazard obtained a lease of their whole property for the period of twenty years on condition that they should market for themselves at least 40,000 bushels of coal annually in Philadelphia "and should pay upon demand one ear of corn as an annual rental for the property."[4]

The lease being drawn, these men applied to the Legislature for an act to authorize them to improve the navigation of the Lehigh, a similar permission formerly granted having expired by its own limitation. They stated that their object was to get coal to market. The hearing granted by the Legislature was favorable, though the repeated failures that had attended other ventures led many to characterize the scheme as "chimerical." An act of March 20, 1818, gave the company various powers, embracing the whole scope of tried and untried methods of getting "a navigation downward once in three days for boats loaded with 100 barrels, or 10 tons."[5]

---

[3] Report of the Committee of the Senate, 1834.

[4] Pamphlet reprinted in Hazard's Register, 1841, Vol. III, Philadelphia, W. F. Geddes, p. 81, referred to hereafter as Hazard Pamphlet; see also Memoir of Josiah White, p. 32 *et seq.*

The month after the act was passed by the Legislature, Hazard and White borrowed some surveyor's tools from the Delaware and Schuylkill Canal Company—then the only instruments of that sort to be found in Philadelphia—and made a preliminary survey of the route. They found that a road could be constructed on a down gradient all the way from the mines to the river, and they were told by "persons residing in the neighborhood . . . that the water in the river never fell below a certain mark on a rock at Lausanne Landing." This satisfied them that there would always be a sufficient amount of water in the river to give the depth required by the act of the Legislature, providing a series of wing-dams and channel walls were built. By the use of this plan of improvement and flat-bottomed boats designed to hold only a single load, they were confident they could overcome the fall of 1,274 feet between Stoddartsville and Easton.

Before attempting to raise the capital to carry out the improvement the promoters published, in pamphlet form, a description of the property and a proposal to create a company to exploit the resources. Subscriptions of stock were solicited and taken under the condition that the subscriptions should be binding only when a committee should visit the lands and report them as represented.

A committee was sent out for this purpose, but two out of three reported that, while the improvement of the navigation was perfectly practicable and would not exceed the cost of fifty thousand dollars, the making of a good road to the mines was entirely impossible. This report, of course, voided all the conditional subscriptions of stock.

---

[5] Hazard, Vol. III, Pamphlet, p. 81. Also an act to improve the River Lehigh, 20 March, 1818.

Some of the subscribers had confidence in the feasibility of the river improvement and some in the coal mining scheme, so the next move was for the organization of two companies. Proposals were issued for the organization of a navigation company to improve the river under the name of "The Lehigh Navigation Company." The capital stock was to be $50,000, those who furnished the money having all the profits on the navigation up to 25 per cent, all profits beyond that to go to White, Hauto and Hazard, who kept the exclusive management of the concern. The money was subscribed under these conditions and the company formed on the tenth of August, 1818. Work on the improvements was begun at once. A boat was built on the Lehigh in which the managers took up their quarters. The hands employed had similar accommodations. As the work of constructing the wing-dams progressed the boats moved down stream.

Meanwhile the Lehigh Coal Company was being formed to build a road to the mines, mine coal and transport it to the river. On the twenty-first of October, 1818, the organization was complete, with a capital stock of $55,000. The stock was taken upon the same plan as in the navigation company, with the exception that the promoters were to receive all profits above 20 per cent, and they in turn conveyed the lease of the coal mine company's lands and of other tracts of land which they had purchased to trustees for the benefit of the new company. In 1818-19 the company succeeded in building a descending road from the mines "built as regularly as the ground would admit of and to have no undulation."[6] A railroad was to be installed as soon as the business would warrant the expense. "A pair of horses would bring down from four to six tons upon it in two wagons."

---

[6] Hazard, III, Pamphlet, p. 82; also Memoir of Josiah White, p. 46.

Everything was in readiness to begin operations, when a drought of unusual severity proved that the ordinary supply of water in the Lehigh could not be relied upon to afford regular navigation. The plan was adopted of storing up the water and then letting it flow into the channels in an artificial freshet. This was done by building dams near Mauch Chunk, in which were placed sluice gates of a peculiar construction, the invention of Josiah White, whose resourcefulness we shall have occasion to notice again later. When the dam was filled and enough water had run over to restore the river to its usual level the sluice gates were let down and the boats which lay in the pools passed down on the long wave.

Hazard and White now bought out the interests in the concern held by George F. A. Hauto (March 7, 1820), and on April 21, 1820, the Lehigh Coal Company and the Lehigh Navigation Company agreed to merge as the Lehigh Navigation and Coal Company, providing $20,000 extra capital were raised by a given date. Nearly three-fifths of this amount was subscribed by White and Hazard. With these resources the navigation was put in order and 365 tons of coal sent to Philadelphia. Thus began the first *regular* shipment of anthracite coal, the first from the Lehigh and the first in America.[7]

More funds were still needed to put the works in good order, especially for a dam at one place to raise the water higher than was done by the wing-dams. Therefore on the first of May, 1821, the organization of the company was entirely recast, with an increase in capital stock. All the interests became more closely amalgamated, for in consideration of stock to be given them, White and Hazard gave up to the company all their exclusive rights and privileges and became ordinary stockholders. Business was to be carried on by five managers, two of whom were to reside at Mauch Chunk to superintend the navigation and coal department, while the others took care of the finances at Philadelphia. With this new organization the name of the company became the Lehigh Coal and Navigation Company.

---

[7] Hazard, III, p. 83, also Report of the Company, 1825.

There was much timidity on the part of the public in subscribing to the $50,000 increase in stock. On the one hand, many still doubted whether a market for anthracite could be created, and on the other, the company's business was growing and both shareholders and investors were becoming anxious as to their responsibility. An application was made to the Legislature for an act of incorporation, which was granted February 13, 1822. This overcame the objection as to liability, so that the stock was increased in that year by subscriptions amounting to $83,950.

Equipment and Management.

The boats used on the descending navigation were quadrilateral boxes or arks 16 to 18 feet wide and 20 to 25 feet long. At first, two of these were joined together by hinges to allow them to swing up and down when passing the dams or sluices, but as the men became more expert in the work and the channels were straightened and improved the number of arks joined was increased until a total length of 180 feet was often reached. Long oars were used to steer, as on large rafts. Machinery was designed to cut in a definite form the planks of which the arks were made, and the builders became so expert that it is stated that five men could put one of the sections together and launch it in forty-five minutes.[8] This sort of boats was regularly used on the Lehigh until the end of 1831, when, with the partial completion of the Delaware Division Canal, boats which could be returned up the river began to take their place. In 1831, 40,966 tons of coal were sent down, which required so many boats to be built that they would have extended over thirteen miles if placed end to end. The arks made but a single trip and were broken up for lumber at the end of the voyage. The spikes, hinges and other iron work were returned to Mauch Chunk by land, a distance of eighty miles. The men who brought the boats down walked back for two or three years, after which some of the tavernkeepers kept rough wagons to carry them back.[9]

---

[8] Hazard, III, p. 83.

The descending navigation by artificial freshets in use on the Lehigh was, it is claimed, the first example of the use of that method of navigation as a regular business.[10] It was inspected and the Governor's license to collect toll obtained on January 17, 1823, at which time it had already been in use for two years. No toll was actually charged, however, until 1827. The traffic down the canal in these early years was, of course, exclusively frontier products and coal, shipped almost entirely by the company. Of the latter there were in 1826, 31,080 tons; shipped by others, 200 tons, besides lumber in boats, 500 tons; lumber in rafts, 2,131 tons; rye, 62 tons; various, 22 tons, and the list would not be complete without that typical article of frontier export, whiskey, of which there were sent down the river in this year no less than 105 tons.[11]

The great consumption of lumber soon necessitated that the company should find a communication by water with the pine forests above Mauch Chunk. The bed and banks were so rocky that single boards going down stream became badly battered, and saw logs fared but little better. Further, it was evident that the increasing demand for coal could not be met if a new boat had to be built for every load, and that if the forests were destroyed at the then rate of consumption (400 acres a year) the time would soon come when there would be no lumber available. More-over, since 1825, the Schuylkill region was tapped by an uninterrupted slack-water navigation which gave it a decided advantage in the competition, and allowed the almost indefinite extension of the coal trade by that route.[12]

---

[9] Annual Reports of the Company, *passim*.

[10] Hazard, III, p. 83.

[11] Niles, 31, Dec. 30, 1826.

For these reasons it was concluded that the Lehigh improvements must be changed into a slack-water navigation. The acting managers at Mauch Chunk formed an ambitious plan to change it into a steamboat navigation with locks 130 feet long and 30 feet wide, capable of accommodating a steamboat carrying 150 tons of coal, and the first mile below Mauch Chunk was arranged for this kind of navigation. Such an enlargement would evidently be of small value unless the Delaware were also improved so as to allow the large boats to reach the Philadelphia market, consequently an application to the Legislature was made for an act authorizing the improvement of the Delaware. The state itself, however, decided to construct a canal along the river, provided the estimated expense of construction should not exceed a certain limit. The limit was so small as to preclude any idea of the workability of the steamboat plan.

By 1826 the turnpike road from Mauch Chunk to the mines was in need of enlargement to accommodate the increase in business. It could not be kept in repair without being coated with stone, and it was determined to change it into a railroad, as had originally been planned. The only railroad then in use in the United States was the Quincy railroad, made in the fall of 1826. There had been one of wood not plated with iron at Leiper's stone quarry about three-fourths of a mile in length, but it was worn out and no longer in use. The railroad from Mauch Chunk to the summit mines was built in the first four months of 1827 and was completely in operation in May.[13] It was nine miles long, with a descending grade all the way from the mines to the river, and "approximates in facility of transit

[12] Hazard, III, p. 84, Pamphlet.

[13] Report, Jan. 14, 1828.

to a small canal."[14] All the moving of freight was done by gravity, with the exception of that on the three-quarters of a mile beyond the summit. The empty wagons were drawn back to the mines by mules which rode down with the coal in wagons "each to hold three or four mules," enabling them to make two and one-half trips to the summit and back, thus traveling about forty miles each day. This unique arrangement was also the suggestion of Josiah White. At first the cars were run from twelve to fifteen miles an hour, but the speed was reduced because it was too hard on the track, and the horses and mules riding down "got and kept sick." In 1831 a similar gravity road, though with a more gradual incline, was built for a distance of five miles from the Mauch Chunk landing to the Room Run mines.

By 1827 the state was committed to the building of the Delaware Division, and it was determined to go on with the improvement of the Lehigh by a canal and slack-water navigation from Mauch Chunk to Easton.[15] Canvass White, then one of the most experienced of American canal engineers, was called in to estimate the cost of construction. He recommended a canal of the type then generally in favor —one with a capacity of twenty-five tons. The acting managers were in favor of a larger one, and asked for two estimates, one for a canal forty feet wide, one for a canal sixty feet wide. The difference in the estimates was so small (about $30,000) that the larger one was unanimously adopted, a decision the wisdom of which was clearly proved by time.[16] The dimensions were to be 60 feet on surface, 5 feet deep, lock 100 feet long, 22 feet wide, to carry boats of 120 tons.

---

[14] Report, Jan. 12, 1829.

[15] Report of the Board of Managers, Jan. 14, 1828.

[16] The enlargement was White's idea. Report dated Jan 14, 1828. The report of Jan. 11, 1830, announces the invention of a new contrivance to haul up the cars out of the mines and the discovery of hydraulic cement along the line of the canal—both by White.

Soon after this the canal commissioners of the state met at Bristol to decide upon the letting of the contracts for the Delaware Division. The representatives of the Lehigh Canal urged that the work be arranged to correspond to that then going on on the Lehigh. The decision of the commissioners was against this provision, on the ground that "the experience of Europe had proved that a twenty-five ton boat was the size most cheaply managed." A partial success was finally achieved, however, when the commissioners concluded to make the locks one-half the width and of the same length as those on the Lehigh.[17] This gave the Delaware Division the nominal capacity to pass boats of sixty tons.

The improvements on the Lehigh were open for use from Mauch Chunk to Easton at the end of June, 1829, but the Delaware Division, though commenced but four months later was not regularly navigable until nearly three years afterwards. The construction was unsubstantial, and at last Mr. White was called in "to make a good and permanently useful navigation."[18] The completion of the Delaware Division Canal simplified the canal business very much by the change from temporary to permanent boats and the discharge of the large force of men formerly engaged in building the boats and preparing the lumber for them. The work involved in producing boats may be indicated by the fact that if put end to end these "arks" would have reached a length of 15¾ miles in 1827,[19] 13½ miles in 1828;[20] and in 1830, 11⅔ miles.[21] In 1834 the use of arks was discontinued.[22]

When the company was reorganized in 1821, with an increase of $50,000 in capital, as noted above, it had been arranged that all dividends should go to the subscribers of this extra amount until 3 per cent should be reached, then any additional dividends should go to the original subscribers until 3 per cent should be reached, then to White and Hazard until they got similar returns, after which all stockholders should share on the same basis. On January 1, 1822, the first dividend was paid to the preferred subscribers, amounting to 3 per cent, a rate regularly paid thereafter. In July, 1822, the original subscribers got 1 per cent and from that time on 3 per cent regularly, except in July, 1824, when their dividend was omitted. On the stock given White and Hazard 1 per cent was paid in January, 1824, and 2½ per cent in January, 1825. On January 1, 1826, the dividends on all stock rose to 3 per cent, after which all shared equally, according to the agreement.

---

[17] Report, Jan. 12, 1829.

[18] Hazard, III, Pamphlet, p. 85.

[19] Report, Jan. 14, 1828.

[20] Report, Jan. 12, 1829.

[21] Report, Jan. 11, 1831.

[22] Report, Jan. 12, 1835.

In 1823 improvements on the main channel had again necessitated an issue of stock ($96,050) making the whole capital stock subscribed $500,000. The company was also actively buying up the shares of the old coal mine company still outstanding. These shares represented fiftieth parts of the whole property. The purchase of them commenced at $150 per share, and the last was purchased for $2,000 after the slack-water navigation had been made.

When it became evident in 1827 that the Delaware Division was to be built, the company decided to go on with the improvement of its own works, as noted above. The balance of the authorized stock, amounting to $500,000, was accordingly issued in February to provide the necessary funds. The capitalization of the company was limited by the act of incorporation to $1,000,000, and these resources had all been spent prior to the completion of the slack-water canal improvement. In 1828 more funds were needed, and the company applied to the Legislature for an increase of capital.

The attitude of the public toward the enterprise had by this time altogether changed. The scheme was no longer looked upon as chimerical, but it was held that the privileges were so extended that they ought never to have been granted. This prejudice was strong enough to defeat all the requests for modifications of the charter or increase of capital, unless the company in turn was willing to sacrifice some of the valuable concessions that had been made to it. This the company refused to do, so recourse had to be taken to loans, the first of which was negotiated in 1828.

In 1830 the claim of George F. A. Hauto against the company was settled by the purchase by the company of the shares which he had been given at the time he dissolved his partnership with White and Hazard. This obligation had come to the company at the time of its assumption of the special rights and obligations of White and Hazard.[23]

The monopolistic character of the management of the canal was now bringing it into great public disfavor. It was charged with purposely hindering the development of the second coal field by making the charges on the canal so high as to render shipments by individuals not interested in the company unprofitable. "It is on account of this state (of affairs) that the country about Mauch Chunk has long remained a howling wilderness without population."[24] Popular conventions were called by self-appointed committees to protest against the abuse. Vituperation was heaped upon both the company and the law which gave it its charter. Granting "property in a great public water course," said a convention at Allentown, "is . . . selling the people's birthright for a mess of pottage." "The present tolls amount to a prohibtion." The Lehigh Company charged $1.04 a ton for a passage of forty-six miles on their canal, while on the Delaware Division 30 cents was charged for sixty miles.[25] Another convention at "Conyngham Town" on December 20 and 21, 1832, declared, "This company has assessed tolls with the avowed purpose of prohibition." It "scoffs at the citizens" and declares "we have the power and we will exclude you from the market." A protest was drawn up to be presented to the Legislature. Therein several methods of relief were proposed.

---

[23] Report, dated January 11, 1830.

[24] Report of the Committee of the Senate. Packer, Chm., 1834.

[25] Pamphlet entitled "Navigation of the Lehigh, Proceedings of the Convention held at Allentown on May 21, 1832."

It was claimed that it was a mistake to give the company coal mining and trading privileges along with the right to make a navigation, for that made it favor a monopolistic policy. The rights other than those of a navigation company should be taken away. Then traffic would be the company's chief aim, as was the case with the Schuylkill Navigation, a company not possessing the obnoxious general rights. Another remedy proposed was to retaliate for for the high charges by making the tolls on the Delaware Division equally high, thus mulcting the company on its coal trade which passed by that route. Granting a railroad a parallel right of way was also proposed—a company being already in the field, the Beaver Meadow Railroad and Coal Company—which was anxious for the concession. Still another method of relief was urged—the use of the state's right of eminent domain to take the whole of the company's navigation rights by purchase to make the canal in the fullest sense a public highway.

The results of these protests were the appointment by the Senate of two committees in 1832 and 1834 to investigate the charges and determine upon measures of relief. Both reported that the company was acting within its rights and that complaint, if any were justified, should be directed against the Legislature which had granted so extensive privileges. The first committee further recommended retaliation by raising the tolls on the Delaware Division. The second declared that such a policy would only serve to drive traffic through the Morris Canal and out of the state. It thought the only measure of relief was the purchase of the canal. Neither suggestion was acted upon.

The Lehigh Company continued to guard jealously its charter rights, fighting away any proposal to interfere with them or to grant privileges to other companies which might infringe upon them.[26]

---

[26] The more important documents in this interesting dispute are the following:

1. "Report of the committee to whom was (*sic*) referred the memorials of a number of the citizens ...... of Pennsylvania ......, etc., Feb. 16, 1832," condemning the monopolistic policy of the Lehigh Company. Advising concessions to Beaver Meadow Coal Company for a road to Easton. Advising retaliation by raising Delaware tolls.

2. "Navigation of the Lehigh: Proceedings of the convention held at Allentown, May 21, 1832." An attack on the law granting a charter to the Lehigh Company and upon the Lehigh Company's policy.

3. "The proceedings of a convention of delegates elected by the citizens, etc., ... Dec. 20 and 21, 1832." Measures of relief from Lehigh Company's oppression proposed. Protest to Legislature.

4. "To the Committee on Corporations of the Senate (1832)." An argument by Josiah White. Says the so-called conventions are agitations by Philadelphia men, "notorious land jobbers or speculators," who want to harm the company that has developed the Lehigh coal region.

5. "Circular" (dated Harrisburg, Feb. 7, 1833). An argument by Josiah White justifying high rates on coal because of lack of general trade.

6. "To the members of the Legislature" (no date). Argument by Josiah White and Erskine Hazard against a law proposed to give the Beaver Meadow Railroad and Coal Company certain rights.

7. "Report of the Committee of the Senate of Pennsylvania, etc., Packer, Chairman, 1834." Discussing the coal trade and the complaints against the Lehigh Company.

8. "To the members of the Legislature" (1835). Circular by S. D. Ingham. Gives affidavits proving that White said his company intended to raise certain dams to flood the roadbed proposed for the railroad.

9. "Correspondence between the Lehigh Coal and Navigation Company and the Beaver Meadow Railroad and Coal Company," etc. (no date). Letters of Ingham and White on the railroad dispute; also letters to the Legislature on the same subject.

10. "Opinion of H. Binney, J. M. Scott (and others)." Lawyers of the Lehigh Company give their views as to the company's rights in the dispute.

THE IMPROVEMENTS ABOVE MAUCH CHUNK.

The time granted to White, Hauto and Hazard for the completion of the navigation to Stoddardsville was now approaching its end, and the second or Beaver Meadow coal region was rapidly coming into public notice. It, therefore, became necessary for the company to commence the upper part of its work. The Legislature had reserved the right of compelling the company to install a slack-water navigation, and it was clear that the descending navigation by artificial freshets would not be satisfactory to that body.[27] The great fall in the upper part of the river necessitated very high lifts in the locks, making the construction very expensive. In 1835 E. A. Douglas was appointed to carry the work into execution. The work up to the mouth of the Quakake was put under contract in June and thence to White Haven in October.[28] The descending navigation above Wright's Creek was also put under contract.

The prejudice against the company was now becoming less strong, and on March 13, 1837, the Legislature passed an act authorizing the construction by them of a railroad to connect the North Branch Division of the Pennsylvania Canal with the slack-water navigation of the Lehigh. At the same time authority was given to increase the capital stock to $1,600,000,[29] and so much of the former act as required a slack-water navigation between Wright's Creek (near White Haven) and Stoddardsville was repealed.

---

[27] See an Act to Improve the Navigation of the River Lehigh, March 20, 1818.

[28] Report, dated Jan. 12, 1835, and Hazard, III, Pamphlet, also Memoir of Josiah White, p. 90, *et al.*

[29] The financial obligations of the company, Jan. 1, 1840, were:

Capital stock	$1,503.550.00
Permanent loan, 5 per cent	1,253,086.35
Permanent loan, 6 per cent	2,758,416.97
	$5,515,053.32

This act was accepted by the stockholders, May 10, 1837. The rest of the navigation was pushed to completion and the Governor's commission given to the inspectors to examine the last portion of it on September 28, 1837. The commission gave a favorable report October 27, and the Governor issued a warrant to collect tolls on November 2, 1837. On March 16 of the following year the company informed the Governor of the completion of the railroad. The Governor's warrant to charge tolls on the railroad issued June 19, 1838.[30]

The capacity of the canal above Mauch Chunk was in reality only one-half that of the portion below, as it could not admit two of the Delaware canal-boats at a single lockage. The lower section could pass 12,960 tons in an eighteen-hour day. The grading on the railroad authorized by the Legislature to be built between White Haven and the Susquehanna was put under contract in December, 1837. It was 19.702 miles long, with a general slope toward the east. The summit was overcome by inclined planes with stationary engines.

The need of the now completed upper section of the canal can be judged from the development of traffic during the first years of operation. In 1838, the first season, the tolls received were $11,968.09; in 1839, $29,172.51, and in 1840, $56,464.23, this being the third season only, with trade just developing.[31] Everything pointed to a period of great prosperity when the managers looked over the company's affairs in 1840. The canal just completed and in good condition.[32] A line of packet boats was established from Mauch Chunk to White Haven and promised to develop a large passenger and freight trade. It was drawn by horses and covered the rise of 600 feet and distance of twenty-five miles in nine and one-half hours. The Morris Canal was enlarging its locks, and the commissioners had recommended similar action to the state in the case of the Delaware Division. Iron smelting was just beginning to develop at Mauch Chunk, creating a new demand for the company's coal. The company's railroad to supply coal to the canal was completed and the market was good in spite of the hard times that affected the country.

---

[30] Documents in Report, Jan. 14, 1839.

[31] Report, dated Jan. 14, 1839.

[32] Report, dated Jan. 14, 1839.

THE FLOOD OF 1840.

Just at the moment when the report was being written for presentation to the stockholders, however, there was occurring on the Lehigh a disastrous flood, which, complicated by the monetary troubles of the company, was almost enough to wreck the corporation. As a result of the flood "No coal could be got to market," "all resources of the company except the stock of coal on hand and outstanding debts were cut off." To raise funds a mortgage was executed on all the coal lands in the neighborhood of Mauch Chunk.[33] Repairs for the entire line were under contract and by July 10, 1841, it was again in operation from Mauch Chunk to Easton. With the income from the coal business the work was kept going. Stock and loanholders were besought to complete their subscriptions, and it was only with the greatest difficulty that a further subscription of $95,000 was obtained.[34] For a time the company had even to ask the loanholders to forego interest on debts due them.

The disastrous flood had one good effect. The disproportion between the amounts of capital stock and of loans had long been a matter of criticism. This evil was the necessary result of the limitation of the capital stock which the managers had at various times endeavored in vain to remove. The prostrate condition of the company now served to modify the policy of the Legislature. When again a request for increased capital was made, an act was passed (March 13, 1841), "That it shall be lawful for the Lehigh Coal and Navigation Company to increase their capital stock by the sale of shares or otherwise to an amount which shall not exceed the actual cost of the navigation and railroad . . . provided the capital stock . . . shall not exceed 6,000,000 of dollars."[35]

---

[33] Report dated Jan. 10, 1842. The mortgagees were J. White, C. Cope and J. Cox, three of the managers. Act authorizing mortgage, Feb. 16, 1482.

[34] Report, dated Jan. 10, 1842. (Five years before, when the improvements had still not been made above Mauch Chunk, the $50 shares of the company had sold in Philadelphia for $90.50, Niles, 48, p. 59, March 28, 1835.)

A few years of prosperity, declared the managers, would again set the company on its feet. "The Lehigh coal is growing in popularity, iron furnaces are springing up, especially along the Morris Canal, which are bound to demand large amounts of coal, . . . and the improvement of the Delaware Canal will allow the . . market (New York) to be reached by way of the Delaware and Raritan."

TRAFFIC ON THE LEHIGH UP TO 1840.

The early years of the operation of the Lehigh improvements were taken up by problems of construction rather than the handling of traffic itself. The outlet to the seaboard by the Delaware was precarious and in the beginning there was no other. The boats, as already indicated, could not be returned up stream—a fact in itself sufficient to make the operations expensive and to prevent any general trade in anything but rough and bulky products, chiefly lumber. Further, the market for anthracite was undeveloped and had to be created. The shipment of 10,205 bushels to Philadelphia in 1820 "fully supplied the market,"[36] though this shipment represented the whole stock offered for sale. The demand six years later, the engineers of the company report, was not supplied, although 31,280 tons were supplied from the Lehigh and 16,265 from the Schuylkill.

---

[35] Report for 1841.

[36] Report of the Engineers of the Lehigh Coal and Navigation Company, dated December 12, 1826.

The conviction that a great trade was to be grasped by him who created the means of transportation was based on this development and was the motive prompting the enlargement set afoot the next year.[37] Besides the coal trade these men, like other canal promoters, looked forward to making their navigation a link in the route to the west. This was to be accomplished through the north branch of the Susquehanna, a hope which was to prove illusory.[38] The managers "entertain a settled belief that the chief outlet between the Susquehanna and the Delaware leading to Philadelphia and New York will be their canal."[39]

The establishment of a canal and slack-water navigation from Easton to Mauch Chunk was at last a fact in 1829.[40] and a capacity to pass boats from 134 to 150 tons was claimed.[41] The first year's traffic on the completed waterway reached 25,100 tons, of which 11,000 tons were shipped coastwise from Philadelphia, but the advantages hoped for could not be fully realized because of the incomplete condition of the Delaware, Raritan and Morris projects, which still necessitated the use of the cumbersome arks. The first real canal-boats, ten in number, were built in 1829.

The period up to 1840 was marked by a steady increase in the coal traffic on the canal, reaching an average of about 220,000 tons in the last four years of the period. The supplementary canals, the Morris, Delaware Division and Raritan, came into use in the coal business in the period 1830-35, in the order named, and thereafter shared part of

[37] Report, Jan. 14, 1828.

[38] Report, Jan. 12, 1829.

[39] Report, Jan. 11, 1831, and see also Report, Jan. 13, 1840.

[40] Report, Jan. 11, 1830.

[41] Report, Jan. 12, 1829.

the New York and other tidewater trade which before that time had been supplied by transshipment at Philadelphia. In 1830 19,238 tons, or almost half the shipments, were exported from Philadelphia, but in 1835, though 70,194 tons were shipped coastwise, Philadelphia was no longer the sole point of departure. Of the sloops, schooners and brigs loaded with Lehigh coal 194 took cargo at Perth Amboy, 389 at Philadelphia and 486 at Newark. By 1839, if not in 1838, Philadelphia had been set aside as an exporting point in favor of Bristol, at the lower end of the Delaware Canal. But as a point of consumption Philadelphia continued to be important. To the end of the period it consumed rather more than one-half of the company's product.

As already indicated, the traffic was coal almost exclusively at first. Indeed, the general traffic for which such great hopes were entertained does not appear at all in the reports in the first decade of operation of the navigation. From 1831 on, flour and cord wood descended the canal and lime and limestone were sent up, in about the same quantities year after year, indicating the supply of a local trade capable of but slow expansion. The lumber cutting, which had reached such large proportions when the coal was sent down in arks (7,412,185 feet in 1827), fell off, and it was not till the last years of the period that large cuttings for the general market were begun (18,159 tons in 1840—a thousand feet were reckoned a ton). The iron industry makes its appearance in 1833 and has a steady increase, indicative of greater tonnage in the future.

CHARACTER OF TRAFFIC ON THE LEHIGH CANAL UP TO 1840. (ITEMS OVER 1,000 TONS.)

	1831.[42]	1832.	1833.	1834.	1835.
Coal..........	42,743	75,937	122,928	106,518	131,250
Flour..........	2,396	2,338	3,473	2,700	3,980
Lumber.......	2,430	2,807	3,850	3,461	4,467
Cordwood.....	1,084	2,457	2,429	1,863	2,394
Lime and limestone.......	3,684	3,361	3,482	4,013	2,329
Whiskey......	182½	124	357	340	467
Grain.........	....	....	1,206	....	1,768
Other stone, sand and plaster......	....	....	1,335	3,085	3,636
Iron ore	......	....	1,047	1,378	1,490

	1836.	1837.[44]	1838.	1839.	1840.
Coal..........	148,211	224,095*d*	214,211	221,850*d*	225,585*d*
Flour..........	4,536	2,108*d*	3,348	4,366*d*	5,660*d*
Lumber.......	3,650	2,667*a*	5,250	12,406*d*	18,159*d*
Cordwood.......	3,192	3,291	2,247	2,648*d*	3,534*d*
Lime and limestone.......	2,355	4,657*a*	4,288	5,368*a*	6,432*a*
Whiskey[43].....	641	563	350	274	284
Grain.........	2,438	3,145*a*	2,364	2,267*d*	2,521*d*
Other stone, sand and plaster......	2,151	2,237*a*	1,387	1,497*a*	2,410*a*
Iron ore......	2,134	4,487*a*	6,258	8,657*a*	7,075*a*
Iron..........	1,197	1,237*a*	2,203	6,638*a*	4,395*d*
Bricks........	....	....	....	1,981*a*	....

[42] Tonnage other than coal noted in reports till 1830-1.

[43] Upper section sent very little whiskey up to 1840.

[44] First year in which direction is entered in detail. *a*—ascending. *d*—descending.

TRAFFIC ON LEHIGH CANAL UP TO 1840—DESTINATION.

Year.	Shipped from Canal.	Coastwise from Philadelphia.	Morris	Delaware Division	Raritan
1820	10,205 bu. coal.				
1821	30,048 "				
1822	68,320 "				
1823	163,042 "				
1824	267,145 "				
1825	795,000 "				
1826	31,280 coal tons				
1827[45]	32,074 "				
1828	30,111 "	23,000 (about)			
1829	25,110 "	11,000			
1830	43,000 coal tons	19,238[50a]			
	50,225 total "				
1831[50b]	42,743 coal "				
	54,000 total "				
1832	77,292 coal[46] "				
	90,552 total "		over		
1833	122,928 coal "		12,000		
	142,808 total "			"some sent"	
1834	106,518 coal '		27,000		
	129,083 total "		(nearly)		
1835	131,250 coal "	[48]	40,000		"considerable
	155,367 total "				quantity"
1836	148,211 coal "				
	174,072 total "				
1837	224,095 coal "		23,000		20,000
	254,068 total "				
1838[47]	214,211 coal "	30,000[49]	48,700	151,788	11,670
	247,284 total "				
1839	221,850 coal "				
	273,190 total "	44,000[50]	48,431	159,686	21,000
1840	225,585 coal "				
	281,802 total "		30,210	171,210	

---

[45] 1827, Timber cut 7,412,185 feet.
1830, Timber cut 6,500,000 feet.

[46] Elsewhere in report entered as 75,937 tons coal for this year.

[47] The upper section began to be used this year, passed 18,636 tons.

[48] Loaded in coastwise trade 70,194 tons at Philadelphia, Perth Amboy and Newark: Newark 486, Perth Amboy 194, Philadelphia 389 sloops, schooners, and brigs loaded.

[49] "Shipped coastwise," no town given as shipping point. Probably Bristol.

[50] Coastwise from Bristol.

(50a) 12,500 in Philadelphia, 7,615 on line of Belvidere-Delaware.

(50b) Coal 42,743; total over 54,000 tons,

THE PERIOD 1840-60.

The canal transportation interests of the company at the beginning of this period were the most important in the eyes of its managers. The Room Run mines were leased in 1838, and it was planned to lease all the mines eventually and go out of the coal selling business entirely.[1] They report, "Although our company are themselves the owners of extensive and very productive coal mines, yet, as the navigation is now their great preponderating interest, it is obviously their policy to promote the business on the canal and on its feeder, the railroad. It is the wish of the managers that the company shall gradually so change their business as ultimately to become simply a receiver of tolls and rents from its valuable estates, relinquishing to others its coal business.[2]

To attract industries to the region around the navigation the company offered water-power and coal at reduced rates and transportation free "to a large extent." The regular rate of toll was in 1837, $.0065, in 1838-9, $.01 2-3 per ton per mile. The passenger traffic was encouraged by favorable terms to the carrying companies, and by the beginning of 1841 there were two lines of packet boats running from Philadelphia to White Haven, at the head of the canal, and two independent companies were engaged in the passenger traffic on the railroad. Canal-boats were to be transferred on the railroad from Susquehanna to Delaware waters within the year.[3]

This policy of granting favors to encourage the development of the region tributary to the canal was pursued in spite of the great financial strain the corporation underwent during the years immediately following the flood of 1840. Almost two-thirds of the money subscribed to the mortgage of 1841 did not come into the hands of the company as cash, but represented the subscription of loans overdue,[4] and at the end of the year loanholders were obliged to give the interest for the year as an additional subscription. The following year the interest could be paid the creditors only in *coal* at the market price—a practice continued until 1846.[5] This, it may be noted, was the same period of depression which forced the Morris Canal into bankruptcy and brought forth bills—unsuccessful—in the Legislature of Pennsylvania to sell the Delaware Division.[6] The Lehigh Canal was in a better position than either of these other links in the waterway to the seaboard, but their small size hindered its natural development.

---

[1] Report, Jan. 14, 1839.

[2] Report, dated Jan. 13, 1840.

[3] Report, dated Jan. 11, 1841.

The Morris Canal was unable to carry the Lehigh boats up the planes, so they had to be made in sections which were uncoupled at the foot of each plane.[7] In addition, the short-sighted policy of Pennsylvania—attributed to the influence of "powerful rivals" of the company—limited the use even of the facilities at hand. All trade through the Delaware Division to the Delaware and Raritan was forced to pass through to Bristol instead of more directly by an outlet lock, thus involving two days' detention, two hundred and twelve feet of unnecessary lockage and a detour of fifty-four miles.[8] Even when an outlet lock was later provided the charges were so high as largely to destroy its advantage.[9] Underselling by the Schuylkill companies also interfered with profits.[10]

With the fifties came a gradual recovery in business. The company had steadily improved its properties during the period of financial depression by introducing improved steam breakers,[11] and by a backtrack to the mines by which mule power was replaced by stationary engines which drew the cars up to heights from which they ran back toward the mines by gravity—another invention of Josiah White.[12] The company's railroad now called Lehigh and Susquehanna was developing into a "great feeder" for the canal,[13] and by 1852 important improvements had been made and were in process on the Delaware and Morris Canals.[14]

---

[4] Report, dated Jan. 10, 1842.

[5] Reports, dated Jan. 9, 1843; Jan. 8, 1844; Jan. 13, 1845; May 5, 1846; May 4, 1847.

[6] Report dated Jan. 13, 1845.

[7] Report dated May 7, 1850.

[8] Report, dated Jan. 8, 1843.

[9] Report dated May 2, 1848.

[10] Reports dated May 4, 1852, and May, 1851

Thus when business revived the company was in a position to meet the demand of a larger traffic and to profit by the period of prosperity. The years following 1854 were ones of uniform prosperity, even the general financial depression of 1857, though it caused much grumbling on the part of the managers, did not so interfere with profits as to cut down the two annual dividends of 3 per cent each which the company had come to pay.[15]

This period sees the first indication of a change of front on the part of the company as to the field in which its operations are chiefly to be lodged. In 1856 the company reports that the Lehigh Valley Railroad will thereafter be a sharp competitor for the carrying trade on which the navigation had before had a monopoly,[16] and in 1859 the "multiplication of avenues to market and the intensity of competition" forced the company to lower the rate of toll on coal. "The company must look for their remuneration to the augmented production of the mines . . . from which to derive a revenue."[17] This competition and the attending rate cutting brought a large increase on through

[11] Report dated Jan. 13, 1845.
[12] Report dated May 5, 1846.
[13] Report dated May 2, 1848.
[14] Report dated May 3, 1853.
[15] Report dated May 4, 1858, and May 3, 1859.
[16] Report dated May 6, 1856.
[17] Report dated May 31, 1859.

shipments by the Lehigh-Delaware-Raritan route, but a falling off in the through trade from Bristol and through the Morris Canal,[18] but in spite of the low coal prices and toll rates the profits continued to rise.[19] At the opening of the Civil War, therefore, as in 1840, the company had every reason to expect an increase of profitable trade.

TRAFFIC ON THE LEHIGH CANAL, 1840-60.

The period of 1840-60 was one of almost uninterrupted increase in traffic. The navigation was adequate in size to the needs of the time, the demand for the goods which passed over it was rapidly growing, and, greatest advantage of all—it possessed up to almost the end of the period a practical monopoly upon the transportation of the heavy goods from the districts served.

The coal tonnage, both from the company's mines and from outside sources, showed a gratifying increase, and was the mainstay of the company's prosperity. The tonnage of coal rose with hardly an exception from 1841 to 1855, reaching in the latter year the highwater mark of 1,276,367 tons. Railroad competition begins to be felt in 1856 with the completion of connections between the Lehigh Valley and New Jersey Central, but did not seriously affect the tonnage carried at first, though, as already noticed, the company was forced to materially reduce its rates of toll on coal to keep the trade. It was a competition, however, which was bound to grow keener in the future, and the company seemed to realize that it was destined to change the relative importance of their different lines of business, as is shown by their anxiety to make the mines rather than the canal their chief interest.

With the exception of coal, only two classes of traffic show important increases in quantity—these are the materials involved in iron manufacture and lumber.

---

[18] Report dated May 11, 1860.

[19] *Ibid.*

Iron ore was carried chiefly up the canal to the smelters. An important fraction was brought from the mines along the Morris Canal. It furnished a convenient back cargo for the boats which had come down with coal. But it is worth while noticing that even this was not enough to secure the coal boats a monopoly in its carriage, but despite the added expense of transshipment it proved an advantage to the Morris Canal to load a large part of its ore shipments on railroad cars at Port Delaware rather than send it all up the Lehigh Canal. The larger part of the iron which went up the canal in ore came back as pig iron again. The shipment of iron ore up the canal grew steadily till it reached its highest point in 1856 (103,751 tons), after which the effect of the railroad competition is evident. The tonnage of limestone follows about the same variations as are shown in the iron trade. The maximum tonnage is reached in 1852 (33,757 tons). The lumber trade on the waterway went through a similar experience. This active trade of the early forties continued to increase until 1855 (69,247 tons). After 1856 it also began to drop off. The general trade, as in the period before 1840, never became of great importance. The falling off here after the completion of railroad connections is, as would be expected, more rapid than is the case with heavier traffic. After 1856 the period of monopoly was at an end, and the period of railway competition began.[20]

The period from 1860-70 is the most complicated in the history of the Lehigh Coal and Navigation Company. During these years the character of the company entirely changed. The first five years were marked by the feverish prosperity brought by the Civil War—especially by its later years, the latter half of the decade saw reaction. This is the period during which the transportation interests struggle for the control of through routes to tide and for

---

[20] For a discussion of the course of the traffic after leaving the Lehigh Canal see the discussion of traffic in the last period.

TRAFFIC ON THE LEHIGH CANAL—1841-1851.

	1841	1842	1843	1844	1845	1846	1847	1848	1849	1850	1851
Coal	[20]143,038^2	272,553	267,826	377,094	429,492	523,144	643,979	680,746	801,354	723,099	989,790
Flour	4,384^2	3,521^2	4,741^2	5,074^2	5,910^2	7,432^2	4,548^2	4,014^2	5,010^2	4,811^2	4,281^3
Lumber	1,995^2	8,688^2	25,656^2	20,686^2	21,151^2	27,634^2	30,337^2	36,876^2	37,590^2	44,071^2	39,095^2
Cordwood	....	1,419^2	2,021^2	2,614^2	....	1,630^2	2,195^2	4,236^2	3,555^2	3,854^2	2,447^2
Whiskey	....	....	....	....	....	....	....	1,282^2	1,495^2	1,375^2	1,526^2
Grain	2,074^2	2,312^2	1,707^2	1,728^3	2,931^2	2,409^2	1,608^3	1,416^1	1,439^1	1,971^1	1,689^1
Lime, Limestone	2,392^1	6,133^1	5,160^1	9,321^1	16,422^2	18,888^2	23,021^2	22,334^2	29,716^2	18,117^2	29,774^2
Other Stone, Sand, Plaster	1,109^1	1,455^1	2,421^1	2,710^3	3,203^2	3,712^1	2,929^3	3,414^3	6,228^2	2,726^3	2,078^1
Iron Ore	2,693^2	4,841^3	6,483^1	13,789^3	21,700^3	27,404^1	39,136^2	38,769^1	31,699^1	29,416^1	36,808^1
Iron	3,191^1	3,949^1	5,265^2	10,702^2	16,765^2	21,230^2	38,316^2	39,983^2	33,032^2	41,399^2	41,196$_2$
Bricks	....	....	....	1,282^1	1,184^1	1,775^1	....	1,230^1	3,058^1	3,066^1	3,119^1
Charcoal	....	....	....	....	1,590^1	1,031^2	....	....	....	....	....
Salt	....	....	....	....	....	....	1,014^1	....	1,238^1	....	....
Slate	....	....	....	....	....	....	1,026^2	1,405^2	1,642^2	2,635^2	3,125^2

[20] The figures ^{1}, ^{2}, ^{3} indicate whether the traffic was chiefly ascending, descending or equally divided. Only articles amounting to over 1,000 tons entered.

TRAFFIC ON THE LEHIGH CANAL—1852-1859.

	1852	1853	1854	1855	1856	1857	1858	1859
Coal	1,114,684^{2}	1,080,666	1,247,103	1,276,367	1,187,639	900,462	909,464	1,052,231
Flour	[20]5,089^{2}	5,891^{2}	2,082^{1}	2,053^{1}	2,097^{1}	1,750^{1}	[21]1,372^{1}	1,237^{1}
Lumber	57,615^{2}	59,460^{2}	53,835^{2}	69,247^{2}	61,731^{2}	47,779^{2}	52,962^{2}	72,838^{2}
Cordwood	2,300^{2}	2,017^{2}	....	1,409^{2}	1,045^{2}	1,789^{2}	[21]1,500^{2}	3,897^{2}
Whiskey	1,320^{2}	1,887^{2}	1,228^{2}	1,239^{2}	1,034^{2}	....	....	....
Grain	2,035^{1}	1,711^{2}	2,724^{1}	2,530^{1}	3,153^{1}	....	1,114^{1}	....
Lime, Limestone Other Stone Sand,	33,757^{2}	31,832^{2}	28,482^{2}	19,476^{2}	16,854^{1}	28,103^{2}	19,985^{1}	32,238^{1}
Plaster	2,323^{1}	5,985^{3}	5,188^{3}	4,435^{1}	8,633^{1}	7,237^{1}	7,328^{2}	9,246^{1}
Iron Ore	40,504^{1}	78,630^{1}	95,688^{1}	70,737^{1}	103,757^{1}	73,636^{1}	67,216^{1}	79,343^{1}
Iron	48,460^{2}	62,434^{2}	58,525^{2}	72,006^{2}	80,863^{2}	68,416^{2}	58,202^{2}	43,791^{2}
Bricks	1,367^{2}	2,724^{1}	3,613^{1}	1,897^{1}	3,873^{1}	1,213^{1}	....	1,930^{1}
Charcoal	....	....	....	....	....	....	....	....
Salt	....	1,007^{1}	....	1,032^{1}	1,013^{1}	....	....	....
Slate	3,878^{2}	4,823^{2}	4,794^{2}	5,258^{2}	5,326^{2}	4,094^{2}	2,538^{2}	3,172^{2}

[20] The figures ^{1}, ^{2}, ^{3} indicate whether the traffic was chiefly ascending, descending or equally divided. Only articles amounting to over 1,000 tons entered.

[21] Entered as cordwood and bark after 1858.

possession of the coal fields. Building of new roads, heavy loans, increases of stock, mergers, rate cuttings and lawsuits over rights of way, occupy attention one after another and contemporaneously. Into this fight the Lehigh Company enters in full force. In the consequent changes the canal, till now the main interest of the company, drops in importance and finally becomes an asset of only second-rate value. A sketch of the new field of operations taken over by the company and the struggles in which it is involved is introduced here only to such extent as is necessary to show the effect upon the canal itself.

RAILROAD EXPANSION.

The year 1860 found the company still chiefly interested in navigation and owning only the short railroad used as a feeder to the canal. To insure a permanent tonnage for the canal, the first step was taken in railroad expansion by advancing to the Nanticoke Railroad Company a loan to aid them to connect their railroad with the Lehigh and Susquehanna.[21]

The following year a similar arrangement was made with the Nesquehoning Valley Railroad.[22] The flood of 1862, described hereafter, induced the company to enter directly upon the construction of a connection between the lower end of the Lehigh and Susquehanna and the Lehigh Valley Railroad near Mauch Chunk, to re-establish the connection between the railroad and the effective portion of the canal destroyed by the action of the flood upon the upper portion.[23] The connection was completed in December, 1862, "and was used to send coal to market by rail[24]—the beginning of what was to be a permanent practice. The building of this division involved the company in litigation with the other railroad companies owning adjoining rights of way, especially with the Beaver Meadow Railroad, which wished to force all the traffic over its own line. The Lehigh Company was sustained by the Legislature and courts. The Lehigh Valley Railroad and the Beaver Meadow Company did not yield, however. They consolidated in 1864 and refused to connect with the Lehigh Navigation Company's shipping facilities at certain points, so an independent connection to Penn Haven was put under survey in 1863 and 1864.[25] This road in turn the Lehigh Valley Railroad tried to cut off by building a road of its own over the right of way which would have to be used. The Supreme Court issued an injunction in favor of the Lehigh Coal and Navigation Company, but they continued to push their project as fast as possible, as it was "not deemed prudent to rely exclusively on the protection of the courts." The Nanticoke Railroad upon completion was leased by the Lehigh Coal and Navigation Company.

---

[21] Report for 1860, especially the Engineers' Report, also Report 1861.

[22] Report, 1861.

[23] Report, 1862.

[24] Report, 1863. See also Engineers' Report for that year.

Difficulties similar to those with the Lehigh Valley Railroad were experienced along the right of way for a large railway extension from Mauch Chunk to Easton upon which the company also entered. Here "it became necessary to fortify our legal rights by permanent occupation of the ground." "For the delivery of coal along the line of the Lehigh and at points beyond inaccessible by water or requiring transshipment our facilities will never be complete until we have (this) . . . railroad as well as a canal between Mauch Chunk and Easton."[26] "Thus equipped, we shall be able to sustain ourselves against all competition." "This business . . . will not interfere with that now done by canal, but will, on the contrary, aid and develop it." "Our main profits will be derived from a branch of business now mainly monopolized by the only existing railroad down the valley, to wit, the carrying of coal intended for reshipment into vessels on tide."

The Lehigh Valley Railroad continued to refuse to give fair use of its facilities by limiting the number of cars supplied. In June, 1865, the connecting link in the railroad connection from Penn Haven to Mauch Chunk was completed and the outlet by canal and railroad from the Hazleton region again established. This was not, however, a connection as yet entirely separate from the Lehigh Valley's road. A controlling interest in the Nanticoke Railway was purchased for $250,000 to protect permanently the company's interest in the traffic over that road and the lease, formerly for twenty years, was extended to ninety-nine years.

---

[25] Reports, 1864 and 1868.

[26] The first contracts on this division were let in the summer of 1864. Reports 1864 and 1868.

The company was still without satisfactory connections between its railroad and its canal. For shipping coal between White Haven and Penn Haven, a distance of sixteen miles, they were as noted above still dependent on the Lehigh Valley Railroad, an arrangement that continued to be unsatisfactory. The independent connection by the extension of its own road was completed by the end of 1866 and put into operation from Wilkesbarre to Mauch Chunk in 1867.[27] The Lehigh and Delaware Water Gap Railway and the Nanticoke Railway were merged with the Lehigh Coal and Navigation Company at a special meeting of the stockholders on July 2, 1867.[28] The former was a road from Catasauqua to Easton, "originally projected before" the Lehigh Coal and Navigation Company's road between these points, and "holding at various places about the only location upon which theirs could be built." The company had acquired a controlling interest in this stock in 1864.

The roads were joined with the extension of the Lehigh and Susquehanna so as to make a single track from Mauch Chunk to Easton. With the exception of the bridge, the line to connect with the New Jersey roads was completed at the end of 1867. This bridge would give the navigation company an independent road from Wilkesbarre to Phillipsburg, New Jersey, authority for the construction across the

---

[27] Report, 1867.

[28] *Ibid.*

Delaware having been gotten from the Legislatures of Pennsylvania and New Jersey. The company held also the Nanticoke Railroad, the Nescopeck branch and the control of the Lehigh and Lackawanna Railroad.[29] In November, 1867, the first coal train passed the bridge at Bethlehem to connect with the North Pennsylvania Railroad, thus reaching the Philadelphia market by rail and on March 14, 1868, the first train crossed the Delaware to Phillipsburg, giving the company a similar outlet to the Morris and Essex Railway. Connections with the Central Railroad of New Jersey were made May 1, and in July with the Belvidere-Delaware Railroad.[30] These outlets opened up the New York market by rail.

On October 20, 1868, the Nesquehoning Valley Railroad was leased for a guarantee to secure dividends of 5 per cent semi-annually, the lessee reserving the right to purchase after ten years. The Lehigh Coal and Navigation Company already owned the majority of the stock.

During the time these extensions were in progress the original road was also being improved, especially by the establishment of a locomotive grade around the inclined planes into the Wyoming Valley—distance of thirteen miles. This road was planned and contracted for in 1863 and opened in May 1866. Especially in the latter half of the decade under consideration the company made extensive purchases of coal lands and contracted with various companies for their coal tonnage to protect the interests of their railroad. To enable the company to make these large extensions in its activities large loans and increases in stock had, of course, been necessary. The capital stock in 1860 amounted to $2,479,950, besides $1,803,000 scrip stock issued in 1855-7.[31] This scrip was changed into stock by

[29] Report, 1868.

[30] Report, 1868.

[31] Report, 1860.

a vote at the annual meeting for 1862,[32] to take effect January 1, 1864. Each year now saw a further increase, the totals being as follows:

January 1, 1864	$4,282,950
January 1, 1866	6,091,700
January 1, 1867	6,137,000
January 1, 1868	8,739,800

In 1867 a loan of $5,000,000 was authorized and sold at 85. In this year the assets of the company including railroad, canal, coal lands and improvements were valued at $16,707,693.17, of which the canal formed $4,555,000. This was the value of the canal as reckoned in 1845, all the extensive subsequent repairs having been charged to current expenses. The figures indicate the change in importance of the branches of the company's business.

THE CANAL IN THE PERIOD 1860-70.

The outbreak of the Civil War, though it checked at first the demand from the manufacturing interests, brought no permanent disadvantage to the business on the canal. The great apparent prosperity of the manufacturing interests during the later years of the struggle caused an unprecedented demand for the products carried and checked, for the time, the results of the railway competition, which otherwise would have made itself more keenly felt.

The profits of 1860 were an improvement over those of 1859, notwithstanding the temporary check to the iron interests—the chief customers for the lump coal.[33] The low prices for coal and sharp competition of the carrying companies continued to cut down profits in y861, anl then in 1862 came the greatest misfortune ever suffered by the canal.

---

[32] Report, 1863.

[33] Report, 1860.

On the fourth of June a heavy storm, lasting thirty hours, swept over the coal region. The water rose twenty-seven feet above the Mauch Chunk dam and swept everything before it. The damages resulting on the Lehigh Canal alone were over $1,000,000. Even this tremendous loss did not wreck the company, as had the much less severe flood of 1841. Repairs were begun at once, aggregating $566,381. Almost all the money was spent on the lower section, and it was decided to abandon the upper part, much of "which was built only under compulsion." Permission was asked from the Legislature to replace the upper section by a railroad and to abandon all the upper navigation except one and one-half miles above Mauch Chunk, where good shipping facilities could be installed. The high dams above Mauch Chunk, it was claimed, were partly the cause of the disaster. The Legislature, by an act signed March 4, 1863, gave the company authority to abandon any part of the works above Mauch Chunk and substitute the proposed railway. The lower section of the canal was at once put into condition again, and the next year (1863) the company was able to make the remarkable announcement that, notwithstanding the apparent crippling of the navigation, greater profit had been reaped than in any previous year. The next year also was exceptionally prosperous. The company was unable to handle the large amount of traffic offered, a condition present also on the competing railroad. The profits of operation were over 30 per cent on the whole amount of capital stock, and in 1865 two dividends of 5 per cent each were paid and a surplus of $567,837.79 was still left to be charged to profit and loss. In commenting upon the extraordinary conditions the managers say "mining of coal is prepared to receive (an) immense development in the upper Lehigh and Wyoming region whenever the means of transportation shall be provided." These are "at this time . . entirely inadequate to the lemand." "Operators . . claim to have hardly been able to keep their collieries at work more than half the time last year for want of cars."

As has already been indicated, the chief efforts of the company by 1865 were being directed toward railway extension, but the managers declare,[34] "Whilst we attend to the construction of our great railroad line . . we must not overlook the equal claims of our canal . . our intention is that the two works shall aid each other." "To make the canal route all that it should be, however, it has long been felt that greater unity or concord of action should exist between the several companies controlling together the through lines to Philadelphia and New York, so that they might . . nor as heretofore often embarrass each other and the public by failing to agree about tolls or to unite in improvements." To "secure these advantages" and to place our canal beyond power of any hostile interests a lease of the Delaware Division Canal for a term of ninety-nine years has been negotiated and a contract entered into . . with the Delaware and Raritan Canal Company, by which the through tolls to New York will be at all times during the lease shared in certain equitable proportions by the two companies."

Under this agreement the Lehigh Company guaranteed to pay the interest on the bonded debt of the Delaware Division Company at 6 per cent and to pay semi-annual dividends of 4 per cent on the capital stock of $1,633,350. This gave the Lehigh Company absolute control of the coal route by canal to Philadelphia and a voice in the management of that to New York.[35] The advantages which it was hoped would be reaped by this consolidation of the interests of the three most important links on the canal route to New York were not reaped. A coal and rate war cut down the profits of both the mining and transporting companies.[36] The rates on the Lehigh and Susquehanna were reduced 30 per cent and "large reductions" were made in the tolls on the canal. Charges of $1.50 per ton in 1866 fell to 90 cents in 1867.

---

[34] Report, 1865.

[35] Report, 1865.

[36] Report, 1867.

The management of the boats by individuals, which was the rule up to this time, proved unreliable, and in 1867 a line of boats was established under an energetic firm. An appreciable improvement resulted and two other similar companies were founded in 1869, but the low prices of coal and the contests for traffic cut down the profits of the company in the years following the Civil War and made the outlook a gloomy one.[37] The competition of railroads continued to become more severe, especially as they reached market the year round, while the canals had to be closed in the winter. As early as 1867 the company devoted half of its car equipment to the railroad business.[38]

The canal, though not the main interest of the company, could, the managers thought, still be put into a position to hold its own in the competition with the railroads. The chronic complaint against the Delaware Canal did not disappear with its acquisition by the Lehigh Company. "The Lehigh Canal is large enough throughout its length to pass boats carrying 175 to 200 tons." "The Delaware and Raritan has even greater capacity, but the Delaware Division will pass no larger boats than those carrying 100 tons.[39] Improvements on this section costing $500,000 were recommended by the engineers, but the company made no move.

The next year a freshet cut off almost all the canal revenue for the season,[40] and the attention of the company thereafter was still more concentrated upon the railroad. The "business of the canal shows a very unsatisfactory result. . . The reports of income . . indicate the increasing importance of the railroad. The company must in the future regard this as its most certain source of revenue. The canal is more liable to injury from freshets." "The entire destruction would still leave the company the means . . to market all of its own coal and a large amount for other parties."[41] The decade closed with a declaration that "profits are dependent almost entirely upon "the coal trade and the railroads." "No considerable revenue from (the) canals" was reaped, though they may be able to pay good profits in prosperous years. They pay only when tonnage is over 650,000 or 700,000 tons, as the tolls below that amount must go to maintenance.[42] Added to the disadvantage through the lack of capacity of the Delaware Division, the Delaware and Raritan now passed into the control of the Pennsylvania Railroad, a competing interest.

---

[37] Report, 1867.

[38] Report, 1868.

[39] Report, 1868.

[40] Report, 1869.

SITUATION AT THE END OF 1870.

The decade closed with a gloomy outook for the company. They had exhausted their credit by the loans and stock increases rendered necessary by their extensions. Strikes, freshets, coal and rate wars had for several years partly cut off the usual sources of income. The capacity of the railroads across New Jersey had proved a disappointment. When their road reached the Jersey shore, in 1858, they found that other large roads previously in the field were pressing the Jersey roads for the use of all the available equipment. The contract entered into with the Morris and Essex Railroad was unsatisfactory, and not until November 1, 1870, was a suitable agreement gotten with the New Jersey Central, and even this was only for a few years.

Further, the possibility of a combination which would leave the Lehigh and Susquehanna an isolated branch of railroad impressed itself on the directors. Since 1868 the

---

[41] Report, 1869.

[42] Report, 1870.

Morris and Essex had passed into the control of a rival company, and the Belvidere-Delaware, owned by the Camden and Amboy Railroad Company, was about to pass into the hands of another. This left the Central Railroad of New Jersey as the only outlet. Should it join with opposing interests, the Lehigh and Susquehanna would soon find itself at the mercy of its rivals.

Both financial and strategic reasons counseled that the company should ally itself with some interest which could assure it a market and could develop its railroad holdings.

THE PERIOD 1871-1907.

The precarious situation in which the company found itself in 1870 induced the stockholders, on March 28, 1871, to confirm a lease of the company's railroad properties to the Central Railroad of New Jersey. The Lehigh Coal and Navigation Company was to receive as rent one-third of the gross receipts on all business on the leased roads. The lessee purchased all the equipment by assuming $2,310,000 of the lessor's debt. The interests of the lessor were to be protected in case of merger with the Lehigh Valley, and all cars required to carry coal from the Lehigh mines were to be furnished. The Nesquehoning tunnel and the roads beyond were excepted from the lease. The Central Railroad of New Jersey was given the option to lease the canal and its appurtenances, with the exception of ground and water rents, and to take over the Delaware Division at any time within three years from August 1, 1871. For this an annual rental of $300,000 was to be paid.

Such an agreement the company hoped would relieve them from the responsibilities of railroad management and allow the development of the coal and canal interests, especially the former. They were to become again "a coal and navigation company," "as during the period of (their) greatest prosperity.[43] The Central Railroad took possession as lessee on April 1, and the Lehigh Company proper turned its attention to the development of the possibilities of the canal. The managers state, "The company enjoyed many years of great prosperity before it commenced extending its railroad." "The principal extension . . changed the company from a coal and navigation company to a railroad company owning mines, with a canal as a subordinate means of transportation."[44] . . "While we were taxing our resources to the utmost for the development of our railroad interests we were compelled to neglect our canals and coal lands. . . There was at all times an urgent demand for money on the part of the railroads, and as expenditures there would give us an immediate return . . the railroad demand was met." The other properties, especially the coal lands, were now to be developed. Through the dull season of 1871 the canals were steadily improved and made "stronger than ever before."[45] The next few years did not, however, see a large increase in canal traffic. The company concentrated its investments in extending the holdings of coal lands and in improving the mines. When the panic of 1873 swept over the country the managers found themselves unable to keep their holdings and determined to dispose of the coal lands in the Wyoming region, then not well developed and producing but little revenue.[46] "After long negotiations a sale was finally effected to the Honey Brook Coal Company," controlled by the Central Railroad of New Jersey. The same interests leased the Lehigh coal lands, and on December 31, 1873, contracted for the maintenance and operation of the canal, including the charges upon the Delaware Division. This put the Central Railroad of New Jersey into possession of practically all of the company's property. The Wyoming lands brought $4,728,803.63, which was applied to reduce the floating debt. The Lehigh coal lands were let at a minimum rental of $500,000, to be increased by a royalty of 21 per cent on coal mined above certain gradually rising amounts. A fixed income of $200,000 was guaranteed from the canal, besides maintenance expenses.

---

[43] Report, 1871.

---

[44] Report, 1871.

[45] Report, 1871.

[46] Report, 1873.

This agreement for the time removed the Lehigh Company from all active operations. The income from the canal was fixed. That from the coal mines and railroad set by percentages on the gross business done. Maintenance and equipment costs were assumed by the lessee. The prosperity of the company was still dependent upon the coal trade, however, for by that was gauged the prosperity of the railroad, which now represented about two-thirds of the investment.

For the Lehigh Company the agreement was a fortunate escape from the financial embarrassment, but the lessee in turn found that the obligations incurred were too great to be carried. Both the railway and the subsidiary coal company, the Lehigh and Wilkesbarre Coal Company, passed into the hands of receivers in 1876,[47] jointly owing to the Lehigh Coal and Navigation Company $1,121,450.04. On the canal business a small profit had been realized in 1874, but losses came in 1875 and 1876, partly due to a diversion of canal tonnage to the railroads. The mine leases had proven unremunerative on account of the low prices realized on coal. Over a million dollars had been spent in increasing the capacity of the mines.

The year 1877 saw the return to the company of the properties leased with the exception of the railroad, as the receivers could not pay the rent on the coal lands and "refused to continue to operate the canals, abandoning all control over them." The Lehigh Company resumed control early in January, 1877, and again became "a mining and transportation company." This short period of retirement from active business was by no means unfortunate

[47] Report, 1876.

for the Lehigh Company. The improvements made by the lessees, totaling over $1,100,000 expenditure, "were abandoned . . without compensation . . when the property reverted." The company had relinquished control during the period of greatest financial depression and came back into possession when the crisis was over and the worst of the coal wars past. The canal and coal business both improved, due to the limitation of output in 1878, and the managers again expressed the belief that "There is still some margin for profit on a large business on canals."[48]

The next move of the company in the management of the canal branch of the business was the modification of the contract with the Delaware Canal Company, made on August 20, 1866. Before that date it had been the policy "to divide the coal traffic beyond the terminus of the Lehigh . . between the Morris Canal . . and the Delaware Division. . . When the Delaware Division was leased . . the co-operation of the Delaware and Raritan . . (was secured) . . to protect . . against excessive charges. A lease could not be made advantageous . . unless (influence was) exerted . . over the coal tonnage destined for New York . . in favor of the Delaware and Raritan line to the exclusion of the competing route of the Morris Canal." The contract by which the company had bound itself, under this idea, to the Delaware Division was "found oppressive and onerous."[49] The continuous losses on operation prompted the company to try to escape from it. The case was brought to a climax in July, 1878, by the arrival at maturity of the $800,000 mortgage bonds of the Delaware Company. The Lehigh Company sought to escape from payment of this obligation on the ground that the stockholders had never sanctioned the lease and that, in any case, it was beyond the powers of the companies at the time to enter such an agreement. A test case was taken to

[48] Report, 1878.

[49] Report, 1878.

the courts, but before a decision was rendered a compromise was arrived at, February 1, 1879. The guaranteed interest on the Delaware Division stock was lowered from 8 per cent to 4 per cent, the holders being given the right to change their shares for an equal number of the Lehigh Company. The Delaware Division Company ratified the agreement on the fourth of February, 1879.[50]

The statements as to tonnage to be expected on the canals show that, in the opinion of the directors, the hope for maintenance of a large traffic on the canals was becoming less, though the unusual conditions in the coal market might for a time maintain the tonnage.[51] Even in 1879, with a very active demand for coal, especially in the latter part of the year, the tonnage to New York through the Morris and Raritan Canals fell off because of the disappearance of profits due to low toll rates. With the completion of the Lehigh Valley connection to New York there were now four railroads to supply that market and the competition was becoming too severe. For the time the trade along the canal and to Philadelphia was able to maintain itself and showed an increase of 120,126 tons over 1878.[52] The next year total canal tonnage again fell, though higher rate of toll changed the loss on operation into a profit of $90,592.10.

The period since 1880 is marked by a gradual decrease in canal traffic and a continued growth in relative importance in the coal and railroad holdings of the company. In the latter branches of operation there were further purchases of lands when such were offered on favorable terms and various railroad extensions and leases, noted here only in outline.

[50] Report, 1879.

[51] See, however, hopeful prospects outlined in Report, 1883.

[52] Report, 1879.

BOAT SUPPLY.

In 1860, in agreement with the other canal companies supplying the New York market with Lehigh coal, the Lehigh Coal and Navigation Company entered a combination formed to increase the boat supply. Two hundred and ten new boats were provided—large additions were made in 1863. In 1865 $116,054.12 was spent for the same purpose.

The boats built were sold to independent boatmen, and as fast as funds were realized from such sales they were reinvested. Interest in increased boat supply lagged as railway competition increased, and after 1880 no attempt was made even to keep up the equipment. The numbers of both "free boats" and "company's boats" steadily declined.

ADDITIONS TO BOAT SUPPLY BY THE LEHIGH COMPANY.

Boats on Canal	Free boats in Miscellaneous Traffic	Free boats in Miscellaneous Traffic from Morris	Free Coal Boats	Company's Coal Boats	New Company's Boats
1880..........	...	...	...	309	25
1881..........	358	300	141	337	..
1882..........	309	282	117	319	none
1883..........	227	168	129	268	none
1884..........	196	176	143	263	1
1885..........	49	19	130	295	..
1886..........	40	...	144	295	..
1887..........	221	184	117	281	..
1888..........	181	167	106	275	6
1889..........	248	...	101	260	..

The reports after 1889 do not give the number of boats on the canal. In 1907 there were about 100 boats operated by the company and about twenty by individuals.

At the present time the company continues to ship all the coal that can profitably be delivered thus on the canal. The tonnage in 1906 reached 240,150 tons. Experiments are being made on the four miles below Mauch Chunk in the use of electric traction by the company's electric mine locomotives and by a patented device of the American Adhesion Traction Company. But under present conditions there seems to be but little hope of important increase in traffic. If the present experiments in electric traction and other adaptations of modern improvements are successful in enabling the company to deliver coal at Philadelphia at a profit, it is possible that the canal may again prove a valuable route for the delivery of coal. This is proven by the fact that the Reading Railroad finds it profitable to transship its coal at Port Richmond into barges to be sent northward to New England ports and southward as far as Norfolk. If the Philadelphia market and this coastwise trade could be reached by the canal, it might again become a source of profit.

Should the plans for enlarging the coastwise canals be carried to completion, the market to New York and southward would be of increased importance in determining the profit earning possibilities of the Lehigh Navigation.

TOLLS AND PROFITS ON THE LEHIGH AND DELAWARE DIVISION CANALS.

Under the Management of the Lehigh Coal Navigation Company.

	Tolls on Lehigh	Tolls on Delaware	Total Canal Tolls	Profits of Lehigh Canal.	Profits of Delaware Canal
1848	....	....	$333,901.87	....	....
1849	....	....	378,436.90	....	....
1850	....	....	382,504.34	....	....
1851	....	....	458,695.43	....	....
1852	....	....	517,765.66	....	....
1853	....	....	582,385.27	....	....
1854	....	....	720,443.29	....	....
1855	....	....	779,828.20	....	....
1856	....	....	745,274.69	....	....
1857	....	....	526,354.17	....	....
1858	....	....	508,336.98	....	....
1859	....	....	493,829.90	....	....
1860	....	....	522,020.94	....	....
1861	....	....	449,730.89	....	....
1862	....	....	198,492.88	....	....
1863	....	....	392,338.49	....	....
1864	....	....	566,621.58	....	....
1865	....	....	695,289.92	....	....
1866	....	....	757,828.49	$ 480,420.58[21]	....
1867	....	....	630,312.74[20]	247,504.28[21]	$ 80,777.12[22]
1868	$444,433.05	$274,915.69	....	[1]327,713.24[21]	519,735.61[22]
1869	357,855.61	193,790.51	....	[2]181,480.01[21]	143,692.81[22]
1870	344,222.87	221,704.11	....	[3]196,461.27[21]	127,020.61[22]
1871	270,057.64[21]	....	578,462.12	247,159.11	77,968.16[22]
1872	228,840.96[21]	....	506,047.92	395,829.55	102,040.76[22]
1873	247,475.81[21]	....	326,753.19	....	90,872.01[22]
1874	271,830.92[21]	....	200,000.00	....	51,565.15[22]
1875	199,472.39[21]	....	200,000.00	....	88,578.08[22]
1876	142,138.39[21]	....	200,000.00	....	120,006.91[22]
1877	[23] 77,766.12[21]	33,996.35[23]	97,525.29	25,554.88[21]	179,479.78[22]
1878	[23] 99,327.31[21]	....	....	....	148,171.65[22]
1879	[4]145,086.84[21]	91,025.39	....	51,930.24	47,589.87
1880	[5]107,275.59[21]	133,489.09	....	108,666.10	90,176.38
1881	[6]169,772.21	116,043.86	....	55,830.14	74,044.81
1882	[7]164,085.53[21]	97,672.75	....	55,699.11	47,585.81
1883	[8]172,705.48[21]	98,424.19	....	65,551.00	57,745.49
1884	[9]175,525.24[21]	100,580.96	....	77,443.75	58,950.83
1885	[10]145,286.74[21]	[15] 63,352.46[21]	....	45,191.52	9,880.43
1886	[11]134,908.26[21]	[16] 44,331.99[21]	....	27,891.41	4,279.11[22]
1887	[12]105,889.80[21]	[17] 56,121.02[21]	....	10,363.74	15,275.77
1888	[13] 97,754.49[21]	[18] 51,085.43[21]	....	9,299.61	
1889	[14] 92,951.57[21]	[19] 53,483.40[21]	....	8,077.64	16,626.84

TOLLS AND PROFITS ON THE LEHIGH AND DELAWARE DIVISION CANALS.
(Continued)

	Tolls on Lehigh	Tolls on Delaware	Total Canal Tolls.	Profits of Lehigh Canal.	Profits of Canals.
1890	....	....	....	....	....
1891	....	....	....	....	$38,161.99
1892	....	....	....	....	31,343.61
1893	....	....	....	....	16,986.77
1894	....	....	....	....	16,927.45[22]
1895	....	....	....	....	2,975.98[22]
1896	....	....	....	....	16,060.28[22]
1897	....	....	....	....	11,433.43
1898	....	....	....	....	6,089.48
1899	....	....	....	....	7,402.90
1900	....	....	....	....	10,733.93
1901	....	....	....	....	....
1902	....	....	....	....	77,036.86[22]
1903	....	....	....	....	69,039.10[22]
1904	....	....	....	....	159,456.76[22]
1905	....	....	....	....	49,190.33[22]

[20] Includes Delaware Division.

[21] Including water rents.

[22] Loss.

[23] Entered as "Revenue from Lehigh Canal" similar Delaware Division. Also 1879.

[1] Water Rents. $15,219.72. [2] $15,219.72 [3] Water Rents. $18,823.35 [4] $19,830.72.
[5] " 19,755.72. [6] 18,947.00. [7] " 21,065.17. [8] 20,880.89.
[9] " 20,524.82. [10] 20,779.57 [11] " 22,328.72. [12] 23,198.72.
[13] " 22,607.72. [14] 22,379.80. [15] " 1,157.50. [16] 2,284.50.
[17] " 1,410.00. [18] 1,435.00. [19] " 1,410.00.

RATE OF TOLL ON COAL TO NEW YORK.

Year	Lehigh	Delaware	Year	Lehigh	Delaware
1848..........	35	26	1858.........	51	31
1849..........	35	26	1859.........	38	28
1850..........	40	31	1860.........	40	30
1851..........	36	26	1861.........	36–44	27–33
1852..........	36	26	1862.........	30–60	22½–43½
1853..........	41	31	1863.........	50–57½	38–43½
1854..........	41	31	1864.........	57½–81	43–44½
1855..........	58	47	1865.........	57½–81	43–44½
1856..........	58	47	1866.........	58	42
1857..........	51	31	1867.........	34	26

Not afterward given in the reports.

TRAFFIC OTHER THAN COAL ON THE LEHIGH CANAL.

(Only items over 1,000 tons noted. For notes see table for Delaware Division following).

	1860	1861	1862	1863	1864	1865	1866[15]
Flour	1,568[a]	1,545[a]	[1] 1,391[a]	[1] 1,501[a]	[1] 1,313[a]	[1] 1,335[a]	....
Salt	1,046[a]	......	....	....	....	....	....
Lumber	27,034[d]	29,779[a]	15,156[d]	1,700[a]	5,099[a]	3,590[a]	....
Cordwood ..	4,038[d]	2,934[a]	....	....	[2] 1,587[e]	[2] 1,839[d]	....
Bricks	1,510[a]	2,088[d]	....	1,305[a]	2,080[a]	1,955[a]	....
Slate	3,782[d]	1,377[d]	1,101[d]	2,631[d]	1,382[a]	1,409[d]	....
Lime & Limestone	28,757[1]	22,860[a]	10,196[a]	18,172[a]	24,860[d]	21,437[a]	....
Other Stone, Plaster, Sand	9,808[a]	6,026[a]	8,141[a]	10,251[a]	14,560[a]	9,038[a]	....
Iron	50,143[d]	25,738[d]	28,274[d]	28,964[d]	28,392[d]	18,561[d]	....
Iron Ore	113,030[a]	49,652[a]	83,630[a]	92,194[a]	105,363[a]	95,579[a]	....
Zinc	....	3,097[d]	....	....	....	....	....

	1867	1868	1869	1870	1871	1872
Flour	....	[1] 1,208[a]	....	....	....	....
Salt	....	....	....	....	....	....
Lumber	2,713[a]	[3] 2,566[a]	[3] 2,224[a]	[3] 9,758[a]	[3] 1,804[a]	[3]26,643[d]
Cordwood ..	....	....	....	....	....	....
Bricks	3,854[a]	3,967[a]	4,790[a]	1,444[a]	....	1,159[a]
Lime & Limestone......	[4] 1,819[a]	[5] 28,195[a]	[5]37,323[a]	[5] 35,293[a]	[5]42,099[a]	[6]29,425[a]
Other Stone, Plaster, Sand	[6] 69,956[a]	[7] 27,518[a]	[7]29,424[a]	[7] 21,522[a]	[7]18,612[e]	[7]32,129[a]
Iron	27,978[d]	[8] 22,481[d]	[8]13,928[d]	[8] 33,345[d]	[8]19,556[d]	[8]18,896[d]
Iron Ore	140,771[a]	[9]121,851[a]	[9]93,867[a]	[9]105,296[a]	[9]46,195[a]	[9]48,116[a]
Staves, Hooppoles......	[10] 1,051[d]	....	[11] 1,268[d]	....	....	[13] 1,096
Lime and Cement....	....	....	....	2,240[d]	1,469[d]	3,406[d]

	1873[12]	1874	1875	1876	1877	1878
Lumber	32,734[d]	37,810[d]	28,497[d]	[6]23,631[d]	[6]27,365[d]	[8]18,492[d]
Brick	2,406[a]	3,049[a]	2,232[a]	....	....	1,620[a]
Slate	....	....	....	....	....	....
Lime & Limestone......	17,371[a]	92,744[d]	80,215[d]	64,406[d]	65,362[d]	53,968[d]
Other Stone, Plaster, Sand	29,905[a]	33,174[a]	22,520[a]	17,790[a]	17,993[a]	18,646[a]
Iron	8,182[d]	11,333[d]	18,876[d]	22,449[d]	19,960[d]	28,115[d]
Iron Ore	53,639[a]	46,227[a]	32,875[a]	26,867[a]	22,769[a]	57,356[a]
Staves, Hooppoles......	....	[13] 4,881[e]	[13] 2,602[e]	3,412[a]	4,024[a]	5,570[e]
Lime and Cement......	3,100[d]	10,786[d]	11,184[d]	9,844[d]	8,733[d]	12,329[d]
Plaster	....	1,859[a]	1,093[a]	....	....	1,240[a]
Manure & Guano	....	9,015[a]	7,825[a]	7,944[a]	12,396[a]	11,671[a]

TRAFFIC OTHER THAN COAL ON THE LEHIGH CANAL.

	1879	1880	1881	1882	1883	1884
Flour	....	....	1,014[a]	1,114	....	....
Salt	1,778[a]	2,112[a]	2,076[a]	2,644	1,796[a]	1,586
Lumber	23,243[d]	18,800[d]	....	22,778[d]	26,175[d]	22,399[d]
Brick	3,533[a]	2,625[a]	3,214[a]	....	....	....
Lime & Limestone.	41,492[d]	41,677[d]	40,611[d]	46,844[d]	53,476[d]	54,453[d]
Other Stone, Plaster, Sand	[7] 31,418[e]	32,420[a]	37,422[a]	41,068	33,880[a]	35,055[e]
Iron	44,481[d]	22,266[d]	46,410[d]	42,765	[9] 33,246[d]	[9] 26,257
Iron Ore	26,765[a]	53,730[a]	33,765[e]	42,470[a]	31,463[e]	26,946[e]
Staves, Hoop-poles......	5,475[a]	3,522[a]	8.374[e]	7,400	9,390[a]	2,832[e]
Lime and Cement......	11 760[d]	11,231[d]	12,396[d]	8,966	10,501[d]	10,888
Plaster	....	....	1,286[a]	1,294	1,534[a]	....
Manure and Guano	13,467[a]	13,999[a]	10,256[a]	12,710	10,478[a]	10,081[a]
Hay and Straw.....	....	....	....	....	1,493[d]	1,794[d]

	1885	1886	1887	1888	1889
Salt	1,136[a]	1,127[a]	....	....	....
Lumber	20,721[d]	19,222[d]	19,629[d]	13,973[d]	8,538[d]
Brick	1,038[a]	2,178[d]	....	1,118[a]	....
Slate	....	....	....	....	....
Lime & Limestone......	52,853[d]	39,655[d]	37,927[d]	36,487[d]	42,426[d]
Other Stone, Plaster, Sand	30,139[d]	41,119[e]	50,988[d]	36,839[d]	48,086[d]
Iron	22,618[d]	23,361[d]	39,670[d]	18,819[d]	26,274[d]
Iron Ore	11,025[a]	5,734[a]	25,311[d]	20,854[d]	26,392[d]
Staves, Hoop-poles... ..	2,459[d]	2,946[d]	4,200[d]	4,050[a]	3,109[e]
Lime and Cement......	8,934[d]	8,011[d]	5,995[d]	5,536[d]	5,580[d]
Plaster	....	1,076[a]	....	1,322[a]	....
Manure and Guano.....	7,669[a]	7,340[a]	9,567[a]	8,205[a]	6,212[a]
Hay and Straw......	....	13,590[d]	....	1,670[d]	1,474[d]

No entries in reports after 1889.

TRAFFIC OTHER THAN COAL ON THE DELAWARE CANAL.

	1867	1868	1869	1870	1871	1872	1873
Salt	1,155[a]	1,140[a]	....	....	....	....	....
Lumber	7,578[a]	5,852[a]	4,720[a]	5,864[a]	4,437[a]	5,581[a]	5,543[a]
Brick	3,252[a]	4,285[a]	2,188[a]	1,251[a]	1,035[a]	1,828[a]	4,480[a]
Lime and Limestone.	[4]3,937[e]	[5] 45,587[d]	50,982[d]	77,076[d]	67,469[d]	[5] 77,849[d]	79,263[d]
Other Stone, Plaster, Sand	[16]61,248[d]	[7] 29,625[a]	24,030[d]	23,331[a]	17,183[a]	[7] 32,546[a]	37,353[a]
Iron	34,400[d]	[8] 29,019[d]	19,210[d]	37,539[d]	26,174[d]	23,678[d]	13,326[d]
Iron Ore	1,197[d]	[9] 1,745[d]	[9] 4,044[d]	3,988[d]	2,899[d]	[9] 5,294[d]	15,411[d]
Staves, Hoop-poles.	5,287[e]	[11] 3,063[e]	[11]2,502[a]	[11]3,217[e]	2,189[d]	[11] 3,325[d]	4,477[a]
Lime and Cement	......	7,227[d]	5,144[d]	9,015[d]	7,519[d]	10,490[d]	9,132[d]
Plaster	......	1,179[a]	1,035[a]	1,112[a]	....	....	....
Merchandise.	1,495[a]	....	....	....	....	....	....
Manure and Guano	......	5,310[a]	5,121[a]	6,232[a]	6,178[a]	9,073[a]	11,890[a]

From this point (1873) on the entries for the two canals, Lehigh and Delaware, are combined.

In these tables of traffic other than coal on the canals, a, indicates that the predominance of tonnage in the articles ascended the canal, d that it descended, e about equally divided.

[1] Entered as "grain" hereafter.

[2] Cordwood and bark.

[3] "Lumber, lath logs and shingles," in subsequent years.

[4] Includes "plaster."

[5] "Limestone, paving and building stone," in subsequent years.

[6] "Limestone, earth and sand."

[7] "Slate, earth and sand," after this year.

[8] "Bar, rolled and pig iron," in years subsequent to this.

[9] "Iron and other ores," in subsequent years.

[10] Entered as "staves, hoop-poles, posts and rails."

[11] Hoop-poles and cordwood.

[12] After 1873, this includes also the traffic on the Delaware Division.

[13] Hoop-poles, staves and cordwood.

[14] Grain, seed, flour, feed.

[15] No statistics available.

DISPOSITION OF COAL CARRIED.

	LEHIGH CANAL.[10]				DELAWARE DIVISION.		
	Consumed on Lehigh.	Passed into Morris.	Passed into Delaware Div.	Coastwise.	Consumed on Line.	To Delaware and Raritan.	Reached Bristol.
1828	....	....	....	23,000[1]	....	....	....
1829	....	....	....	11,000[1]	....	....	....
1830	....	....	....	19,238[1]	....	....	....
1831	....	....	....	....	....	....	....
1832	....	12,000[5]	....	....	....	....	....
1833	....	13,000	....	....	....	....	....
1834	....	27,000[2]	....	....	....	....	....
1835	....	40,000	....	70,194c	....	[4]........	....
1836	....	23,000	112,082	....	....	20,000	....
1837	....	....	....	....	....	....	....
1838	....	48,700	151,788	30,000	....	11,670	....
1839	....	48,431	159,686	44,000[6]	....	21,000	....
1840	23,955	30,210	171,210	....	....	....	....
1841	....	2,755	....	....	....	....	....
1842	40,000[7]	20,608	211,817	117,397	....	43,640	50,780[8]
1843	40,793[7]	30,000	197,000	70,000[6]	....	49,160	77,840[8]
1844	....	....	....	....	....	....	....
1845	....	....	....	....	....	....	....
1846	....	50,000[5]	....	....	....	....	....
1847	....	62,000	....	....	....	....	....
1848	....	....	....	....	....	....	....
1849	116,830	130,484	580,934	....	....	105,000[9]	....
1850	....	....	....	....	....	....	....
1851	160,603	137,237	691,810	....	....	....	....
1852	151,654	180,189	782,388	....	....	....	....
1853	198,055	222,582	659,909	....	....	....	....
1854	243,825	267,864	734,729	....	35,000[2]	170,000[2]	532,000[2]
1855	229,056	290,730	755,265	....	53,445	156,340	545,480
1856	194,407	285,636	706,251	....	55,263	174,423	476,565
1857	141,751	227,652	530,911	....	31,133	147,545	351,233
1858	141,537	281,950	512,512	....	54,888	164,149	293,475
1859	188,779	255,404	606,506	....	41,342	301,419	263,745

[1] Shipped from Philadelphia.

[2] "Nearly" or "about."

[3] These boats loaded at Philadelphia, Perth Amboy and Newark.

[4] "Considerable quantity" over Raritan.

[5] "Over" this amount.

[6] Coastwise from Bristol.

[7] "On Lehigh and Delaware."

[8] To Philadelphia.

[9] This the first year in which outlet lock used much. Before this went around by Bristol.

[10] No entries before 1827.

DISPOSITION OF COAL CARRIED ON THE DELAWARE DIVISION CANAL.

Year	Reached Bristol	Passed into navigable feeder of Delaware and Raritan	Tons consumed on line of Delaware Canal
1860	260,733	341,816	36,774
1861	288,584	267,347	26,171
1862	106,392	97,410	13,400
1863	24,419	196,559	156,017
1864	202,325	241,200	27,426
1865	160,738	399,066	28,930
1866	....	....	....
1867	251,483	472,751	43,764
1868	293,245	433,005	35,286
1869	185,011	247,345	35,680
1870	354,051	265,771	29,034
1871	269,428	312,185	42,469
1872	311,342	298,626	47,821
1873	313,008	271,750	39,424
1874	415,169	224,440	27,032
1875	319,834	190,968	38,826
1876	324,818	241,462	34,119
1877	132,586	93,922	49,328
1878	131,591	175,184	34,279
1879	244,728	103,980	35,110
1880	225,022	90,810	41,467
1881	175,233	96,438	49,455
1882	133,058	116,079	48,789
1883	133,011	178,840	49,643
1884	128,267	238,756	55,818
1885	104,380	209,956	44,904
1886	104,398	139,243	52,862
1887	65,832	131,106	45,750
1888	62,352	174,639	49,800
1889	86,603	158,432	48,787

Chapter III.

THE DELAWARE DIVISION CANAL.

This isolated section of the state works was not included in the first plans for building a series of waterways which should furnish both inland transportation facilities for the State of Pennsylvania and an outlet to the trade of the growing West. Detached from the other state canals, its object was chiefly to supplement the improvements already in progress under a private company in the Lehigh Valley. Indeed, the Lehigh Coal and Navigation Company had applied for permission to improve the Delaware, but the offer was refused by the state. As the Canal Commissioners state in 1830, the Delaware Division "may be fairly considered as an extension of the Lehigh Coal and Navigation Company's canal."[1] Coal was to be the main source of income, but the canal was also to help develop the up-country trade of Philadelphia and promote the industrial possibilities of the northeastern end of the state. The Legislature first appropriated money for a canal parallel to the Delaware on April 9, 1827, when a survey was authorized and the Board of Canal Commissioners instructed that if certain requirements proved to be fulfilled by the route the construction of a portion of the canal, not to exceed $100,000 in cost, should be put under contract. The survey was commenced on July 9, 1827, and favorably reported upon August 20th. The board at once made plans to begin construction—the first earth to be broken at Bristol and the work to continue northward. The section proposed from Philadelphia to Bristol was to be built last, as its need was less urgent. On October 13th a distance of 18 miles was let out under excavation contracts totaling less than the engineer's estimate. Seven miles more were put under contract on May 20th of the following year, 18 miles on September 18th, 10½ miles on the 18th of November, and 10 miles in December. The following year the remaining 6¼ miles were put under construction, and in 1830 water was let into the canal.

---

[1] Report of the Canal Commissioners. Read in Senate Dec. 13, 1830.

Only the twenty-five miles northward from Bristol were navigable,[2] however, and part of the work first constructed soon needed extensive repairs. The water supply proved a serious problem. No agreement had been made with New Jersey to allow the use of the water of the Delaware, and under the precedent of the action taken at the time of the construction of the Delaware and Raritan the board felt that such permission was necessary. New Jersey indeed showed herself jealous of her rights in the waters of the Delaware,[3] and the commission decided to plan the canal so as to feed it entirely from the Lehigh River, as there were no important Pennsylvania waters upon the right bank of the Delaware upon which reliance could be placed. The length of the canal, combined with the porous character of the earth through which it was dug, soon made it evident that drawing the water supply from the Lehigh alone was a great disadvantage. No arrangement could be made with New Jersey, so the board tried to get a sufficient supply by the introduction of Durham and Milton Creeks and two other small feeders along the line of the canal.[4]

Even with the greatest efforts of the officials, this lack of water continued, and by the end of 1831 it was again reported that the line was still not navigable throughout its whole length. In the dry season the water supply in the lower sections became altogether insufficient, and to remedy the defect the construction of a wing-dam at Wells Falls, with a waterwheel to raise water from the Delaware, was authorized, notwithstanding that the consent of New Jersey had not been granted. "About the first of March,"[5] 1832, twenty-four miles above New Hope were opened, and by the eleventh of June the whole canal was filled, but a succession of breaches prevented its active use until about the middle of October. Thus almost two years were required after the water was first introduced to get the canal into working shape. This condition, the Board of Canal Commissioners claimed, was due to the defective character of work done under contract[6] and to the fact that the state was so penurious in granting salaries to the engineers in charge that first class talent could not be secured.[7]

---

[2] Report of Canal Commissioners, dated Dec. 15, 1831.

[3] Report of the Canal Commissioners, Harrisburg, 1828, dated Dec. 25, 1827; also Report, dated Dec. 11, 1828.

[4] Report of the Superintendent of the North Branch Canal, Nov. 3, 1855, and Report of the Canal Commissioners, Dec. 15, 1831.

The canal had cost much more than the original estimate of $686,596.[8] The amount chargeable against it as first cost was $1,238,027.69.[9] The waterway as built was 25 feet wide at the top, with locks 90 by 11 feet, capable of passing boats of 67 tons burden. This size of the canal and locks proved a great handicap to the proper development of the canal traffic from the very beginning, nor is the neglect by the state explainable because of any unusual physical disadvantages to be overcome. The commissioners reported that an appropriation of $200,000 would suffice to enlarge the canal to the capacity of the Lehigh improvements.[10] The representatives of the Lehigh Coal and

---

[5] Report of the Canal Commissioners. Read in Senate, Dec. 6, 1832.

[6] Report of the Canal Commissioners, dated Dec. 23, 1830; Dec. 6, 1832; Dec. 7, 1833.

[7] Report of the Canal Commissioners, dated Dec. 15, 1831.

[8] Reports of the Canal Commissioners, dated Dec. 25, 1827, and Dec. 18, 1829.

[9] Report, dated Dec. 9, 1836. But the Auditors' Report, quoted in Report of the Canal Commissioners, dated Dec. 21, 1852, gives $1,384,606.96 as the original cost.

[10] Report of the Canal Commissioners, dated March 11, 1834.

Navigation Company met the Board of Canal Commissioners at Easton when the project of the canal was under consideration and strongly urged the advisability of making the state canal uniform with the Lehigh—of 100 tons capacity, with six feet depth and locks to accommodate boats 22 feet wide.[11] Unfortunately, the decision was in favor of the lesser capacity, on the ground that European experience had proved that to be the most economical in operation.

The mistake was evident from the time the canal first began to share in the coal trade. The Lehigh boats had to transship at Easton on account of the narrowness of the locks. Even in 1836 the commissioners, speaking of the future of the Delaware Division, say, "Its connection with the Lehigh Canal and the railways that ramify to the coal beds bordering on the sources of that river must insure it a vast amount of tonnage," but "it is a matter very much to be deplored that the capacity of the locks in this division were not in the original construction made similar to those of the Lehigh. . . . Evidences of the future utility and of the present incapacity of this work are so strong that provision will have to be made at no distant period for doubling its locks or increasing them to a width corresponding with those of the Lehigh."[12]

In spite of repeated recommendations, however, the state took no action. Repairs along the line finally brought the canal from a capacity of 45 to 50 tons up to 55 to 60 tons in 1841,[13] but the water supply was still too deficient to allow the canal to reach its normal capacity. This proved a serious problem. The canal was peculiarly subject to damage by freshets,[14] and in dry seasons it was almost impossible to maintain five feet of water.[15] To obviate this defect dredgings were made in the lower end of the canal, gradually decreasing in depth as progress was made northward.[16] Finally, after fifteen years of continual demonstration of the inability of the canal to meet requirements, the Legislature authorized the beginning of improvements to make the locks correspond with those of the Lehigh.[17] The next year a widening of the prism was also started. This movement to put the canal on its feet began just at the time when a new competition was about to be introduced in the coal carrying trade. The commissioners report, December 28, 1853, that up to that time the Delaware Division "has had no competition for the carrying trade of the mineral region bordering on the Lehigh." "This exemption from rivalry is about to cease. The Lehigh Valley Railroad, which it is said will be completed during the summer of 1854, will connect at Easton with the New Jersey Central Railroad . . . and with the Trenton and Belvidere. . . . The North Pennsylvania Railroad is, it is understood, under contract from Philadelphia to Bethlehem."

---

[11] Hazard's Register, Vol. III, p. 85; also History of the Lehigh Coal and Navigation Company, 1840.

[12] Reports of the Canal Commissioners, dated Dec. 9, 1836; also Dec. 7, 1837; Dec. 27, 1838; March 11, 1839; Jan. 20, 1840. Report of the Canal Commissioners, dated Jan. 15, 1841, declares Morris Canal is widening its locks. Delaware Division must do so to keep its trade. See also report of the Canal Commissioners, dated Dec. 31, 1852.

[13] Report of the Canal Commissioners, dated Jan. 15, 1841.

To meet the new competition the board renewed their recommendations that the canal be substantially enlarged. They pointed to the fact that the Delaware Division Canal was the best paying of the public works. It yielded on the original cost of construction a return of 15½ per cent in 1852, 14 per cent in 1853. In 1854 the net income was 20 ⅓ per cent and in 1855 21.92 per cent on the cost of construction, including the improvements recently made,[18] which had raised the total cost of the canal to about $1,500,000. The board declared that with proper support the canal would be able to hold the coal traffic.[19] The improvements made up to the end of 1854 raised the average boat cargo to 70 tons, but important additions were necessary to make it a true supplement of the Lehigh.

---

[14] Reports of the Canal Commissioners, dated Dec. 7, 1833; Dec. 9, 1836; March 11, 1839; Jan. 20, 1840; Jan. 15, 1842; Nov. 30, 1845; Nov. 3, 1846; Jan. 1, 1851; Dec. 30, 1854.

[15] Reports of the Canal Commissioners, dated Dec. 7, 1833; Dec. 2, 1834; Dec. 3, 1835.

[16] Report of the Canal Commissioners, dated Dec. 3, 1835.

[17] Report of the Canal Commissioners, dated Nov. 30, 1852.

Whatever might be the ability to compete for traffic if improved, it was at once evident that the railroads would cut in on the traffic of the canal in its then condition. The coal trade fell off in 1855 and again in 1856. The state began the deepening of the canal to six feet south from Easton to New Hope and the Legislature in 1857 adopted important changes in rates of toll in the effort to keep the New York coal trade.[20] The movement for improving the canal[21] and making it an active competitor did not receive adequate legislative support, however, for the following year, when the bill for the sale of all the state works not already disposed of came before the Legislature, the Delaware Canal passed, with the others, into the possession of the Sunbury and Erie Railroad Company.[22]

STATE MANAGEMENT OF THE CANAL.

From the beginning of the state construction the management of the canal was hampered by sectional interests within the state and by interstate jealousies. The size of the waterway was inadequate. The limitation to the size of the Susquehanna Canal hampered its development as an outlet for the Lehigh. The interstate jealousies of both New Jersey and Pennsylvania worked to its disadvantage. The attempt to feed the 59¾ miles of canal from the upper end alone, as was originally planned, hampered its usefulness. Negotiations were actively taken up with New Jersey in 1834,[23] but came to no definite conclusion, and the connection established with the Delaware at Wells' Falls without any interstate agreement in 1831 did not solve the difficulty.[24]

---

[18] Reports of the Canal Commissioners, dated Dec. 31, 1852; Dec. 28, 1853; Dec. 30, 1854; Dec. 29, 1855. See also discussion in Report, dated Jan. 2, 1857.

[19] Reports dated Dec. 31, 1852; Dec. 28, 1853, and Dec. 30, 1854.

[20] Act of April 8, 1857.

[21] The state appropriated $50,000 a year to improve the Delaware Division by Acts of May 13, 1856; May 18, 1857, and April 20, 1858.

[22] Act of April 21, 1858.

Pennsylvania also was not blameless in its management of the canal, and up to the last years of its ownership was jealous of any movement which would involve an increased advantage to New Jersey. An outlet lock at Black's Eddy was repeatedly urged by the coal carrying interests, so that they might be allowed to enter the Delaware and Raritan by the most direct route. Pennsylvania refused the request and made the coal boats go clear down to Bristol and then back up the river, because to allow direct trade "would render comparatively useless the balance of the division to Bristol. It would give a sister state and rival city all the benefits to be derived from a connection with the Lehigh improvements."[25] This "dog in the manger" policy was pursued without change until 1846,[26] when, following a recommendation of the Board of Canal Commissioners of two years before,[27] the construction of an outlet lock was authorized at Wells' Falls. Even then it was a compromise measure, as the amount of toll was to be the same as if the boats went to Bristol, the only saving to the shipper being relief from the detour formerly necessary. The lock was to be completed in the spring of 1848. The advisability of abolishing the equality of charges for the different distances was only impressed upon the state just before it surrendered possession.

---

[23] Report, dated Dec. 2, 1834.

[24] See Report, dated Dec. 7, 1833, suggesting a feeder at Blacks' Eddy; also Report, dated Dec. 2, 1834; Report, dated Dec. 3, 1835.

[25] Report, dated Dec. 27, 1838.

[26] Act of April 20, 1846.

[27] Report for year ending Nov. 30, 1844.

In 1857 the board recommends that the old law be repealed, due to the necessity of making concessions because of railway competition for the coal trade[28] to New York. The suggestion was followed by the Legislature, which passed an act authorizing the board to fix the charges at whatever figure they thought would bring the state the greatest income.[29]

INCOME AND EXPENSES OF THE CANAL UNDER STATE CONTROL.

Throughout the period of state control the chief source of income on the canal was the coal traffic. The statistics given in the canal commissioners' reports in the earlier years do not show the character of the traffic, but the preponderance of Easton in toll collecting as well as the deliveries to the Delaware Division reported by the Lehigh Coal and Navigation Company show the coal trade to have been the chief factor of the traffic.[30] By 1837 the canal had reached an earning capacity great enough to pay the interest on the cost of construction, and though the toll on coal continued about six mills per ton per mile,[31] the net product steadily increased. As early as 1844 the state adopted the plan of giving drawbacks on the tolls on coal arriving at Bristol. "This course seemed . . . indispensable . . . in consequence of reduced rate of charges . . . on other improvements (the Morris Canal) of rival corporations." In 1844 the drawbacks amounted to $17,199.63.

---

[28] Report, dated Jan. 2, 1857.

[29] Act of April 8, 1857, two weeks before the canal was sold.

[30] Report of the Commissioners for the year 1839 reports tolls at Easton, $70,290; at New Hope, $4,931.39; at Bristol, $19,473.41.

[31] Report, dated Dec. 27, 1838.

The growth of the coal trade brought increased profits. The total tolls were greater each year than in the last from 1841 to 1855, with the exception of 1853, when interruptions due to improvements under way and a general reduction of the tolls on the state works to meet competition on other transportation lines caused a temporary setback. In the fifties the canal reached its greatest prosperity. It became "the most important portion of the public works" in revenue,[32] and yielded substantial profits of from 15½ to almost 22 per cent on the cost of construction. The high water mark was reached in 1855, when an income of $388,914.63 was recorded, or 21.92 per cent. This revenue was drawn especially from the 755,265 tons of coal caried, one-third of which now used the outlet lock, paying the same rate as the traffic to Bristol.[33] The last three years under state control show a decline due to the growing railway competition.

THE CHARACTER OF THE TRAFFIC DURING THE PERIOD OF STATE CONTROL.

As already indicated the traffic so far as important earnings were concerned, was almost exclusively coal. The reports give statistics on no uniform plan, and in some years they are lacking altogether. The classification does not lend itself to summary, as the various articles are entered under pounds, feet, number, perch, cord, gallon, barrels, bushels and various other heads. In the earlier years a diverse trade in agricultural and dairy products and provisions found its outlet through the canal. Up from Bristol in 1834 the chief articles are wheat, fish, butter, cheese, tobacco and leather. From Easton were sent southward chiefly flour, rye, corn, butter and cheese. Seventeen thousand and twenty-two persons were transported on the canal in this year, the traffic being about evenly divided southward and northward.

---

[32] Report, dated Dec. 31, 1852.

[33] Report, dated Dec. 29, 1855.

By 1845 the character of the general trade has changed. From Bristol northward the chief shipments have become hides, dry goods, groceries and bacon—of this latter 356,461 pounds, and Easton sends out lumber, lime, the products of her growing iron industry and whiskey.

The following table of the chief items of trade, excepting coal, in 1851 is typical of the exchange between the back country and the ports which the canal was serving:[33a]

South from Easton		*From South to Easton*	
Corn.......	256,525 bushels	Tobacco....	346,385 pounds
Oil Cake....	235,200 pounds	Hides.......	1,174,451 “
Leather.....	570,901 pounds	Chinaware..	1,246,030 “
Boards.....	19,038,882 feet	Coffee......	986,982 “
Iron Ore....	81,403,546 pounds	Glassware...	8,170,836 “
Whiskey....	1,907,978 gallons	Iron (about)	6,000,000 “
Slate.......	5,057,630 pounds	Bacon......	5,946,617 “
Live Stock..	2,222,348 pounds		

The direction of shipping and the chief sources of income are illustrated by the following table of tolls on the two principal products carried:[34]

Toll on	Coal	Iron
Easton.......................	$88,704.00	$15,172 22
New Hope....................	22.72	4.18
Bristol.......................	8.92	1,673.88

The whiskey trade down the canal deserves special notice, for, though not so great in bulk as some of the other articles, it represented a very valuable freight, and in connection with it the canal performed an important service to the back country. The shipments of whiskey—the cheapest form in which to market corn—reached a figure truly

[33a] Report dated January 9, 1852.

[34] Report for the year ending Nov. 30, 1847.

surprising when it is borne in mind that the canal carried only part of the total product of the Lehigh Valley region. Both the Morris and the Delaware and Hudson Canals drew from much the same territory. Yet the reports show the following figures:

Whiskey sent from Easton		Received at Bristol
1844	517,877 gallons	532,086 gallons
1847	608,896 "	733,640 "
1848	1,210,184 "	1,332,772 "
1849	2,082,829 "	1,180,175 "
1851	1,907,978 "	2,419,749 "
1853	1,292,411 "	1,815,365 "
1854	1,067,598 "	1,624,371 "

The continued preponderance of Bristol as the destination of the whiskey shipments, even after the construction of the outlet lock, seems to indicate that Philadelphia was found a better market than New York, or that the whiskey for New York went by the Morris Canal in preference to the Raritan route.

THE DELAWARE DIVISION CANAL UNDER INDEPENDENT PRIVATE MANAGEMENT.

The Sunbury and Erie Railroad did not continue to hold and operate the Delaware Division. A separate company was organized July 7, 1858, to take over the ownership and operation of the canal, and on July 14th the Governor issued the necessary letters patent authorizing it to adopt the title of "The Delaware Division Canal Company of Pennsylvania."[35] This company operated the canal nine years. During this period it was hampered by unfortunate accidents to the traffic route from which its tonnage chiefly came, the Lehigh Canal, and by inability to arrive at amicable agreements with its neighbors as to the amount of toll to be charged. Through much of the period, too, the boating facilities were deficient. These causes combined seriously cut into the profits of the organization, so that it did not share to the same extent as the other coal carrying routes the phenomenal prosperity incident upon the Civil War.

---

[35] First Annual Report of the Delaware Division Canal Company of Pennsylvania, Feb. 1, 1859.

In 1858 the coal tonnage fell off, due, it was alleged, to discrimination by the Lehigh Coal and Navigation Company. The company planned to improve their shipping connections with the Lehigh Valley Railroad to render them independent of the upper canal. To overcome the deficiency in boat supply an agreement was entered into with the Lehigh, and the Delaware and Raritan by which each was to contribute to an increase in proportion to the advantages derived from it,[36] but the New York coal trade continued to fall. The railroads were proving too strong competitors and the canal company declared that without better transshipping facilities at the New York end of the route it could not hope to keep up with them.[37]

While the company was looking for a solution of this problem the disastrous freshet upon the Lehigh in 1862 occurred. This threw it back upon the resources offered by the chutes built at Easton in 1859 to connect with the Lehigh Valley Railroad. But neither cars nor boats enough could be secured. Only twenty-eight additional boats were added in 1862 under the agreement between the three companies.[38]

Even three years after the flood the shipping facilities on the Lehigh Canal were reported as "not wholly restored." The losses from this cause[39] were increased by a dispute between the canal companies as to the rate of toll to be charged. For half of the season of 1863 "each party (charged) all the law would allow—by their charters."[40]

---

[36] Third Annual Report, Feb. 5, 1861.

[37] Fourth Annual Report, Feb. 4, 1862.

[38] Fifth Annual Report, Feb. 3, 1863.

[39] Seventh Annual Report, Feb. 7, 1865.

[40] Sixth Annual Report, Feb. 21, 1864.

The company continued to make improvements as fast as its means would allow, and the enlargement started by the state was completed in 1864, giving the canal a capacity to handle 100 ton boats,[41] but the financial condition of the company was unfortunate. The causes noted above made it impossible to hold tonnage, and profits fell off correspondingly. The company finally gave up the struggle and leased all its properties to the Lehigh Coal and Navigation Company in 1866. The lessee guaranteed for ninety-nine years—the life of the lease—semi-annual dividends of 4 per cent on the stock of the leasing company.

STATISTICS OF TONNAGE OF DELAWARE DIVISION CANAL.

	Total Tonnage, exclusive of Lumber	Coal Tonnage
1858	587,741	512,512
1859	770,065	....
1860	808,662	639,323
1861	681,425	....
1862	325,001	....
1863	....	....

No further entries.

After 1861 coal and pig-iron tonnage decreased, New York coal trade fell off.

TOLLS AND OTHER SOURCES OF INCOME.

1851	$256,212.52	1858	$216,617.05
1852	260,036.98	1860	240,864.07
1853	247,918.52	1861	199,100.51
1854	377,662.98	1862	103,402.62
1855	392,673.42	1863	173,407.65
1856	349,922.29	1864	234,248.54
1857	224,329.34	1865	277,020.70

---

[41] Seventh Annual Report, Feb. 7, 1865.

COAL TONNAGE, RECEIPTS, REPAIRS AND EXPENSES ON THE DELAWARE DIVISION UNDER STATE CONTROL.

Year	Coal Tonnage	Total Tolls	Repairs	Total Expenses incl. Repairs
1832	14,353	$6,263.18[6]	....	....
1833	....	44,825.09	....	....
1834	....	54,061.29	....	....
1835	....	56,221.37	$29,250.00	....
1836	....	....	32,748.98	....
1837	....	90,150.50	28,530.00	....
1838	....	84,435.22	38,095.00	....
1839	....	94,695.40	90,612.71	....
1840	....	96,996.25	30,855.57	....
1841	....	59,654.88[1]	115,834.25[2]	....
1842	....	94,459.08	16,553.14	$23,545.11
1844[3]	301,956	109,277.53	15,584.00	67,817.66
1845	392,821	....	15,062.00	....
1846	....	146,321.56[4]	15,370.00	43,554.53[5]
1847	....	172,191.15[4]	15,257.13	24,108.48
1848	....	176,649.84[4]	23,598.87	33,271.52
1849	567,719	196,714.24[4]	23,010.45	32,518.20
1850	....	215,347.87	51,249.30	60,834.22
1851	707,702	253,873.43	32,346.42	57,263.15
1852	774,460	267,294.66	....	....
1853	635,137	253,591.03	35,572.00	57,747.95
1854	764,406	365,327.07	31,383.66	59,878.00
1855	755,265	388,914.63	44,319.21	60,097.80
1856	....	353,782.74	65,255.47	83,355.77
1857[7]	....	224,329.34	....	....
1858[7]	512,512	216,617.05	....	....

[1] Due to flood.

[2] "Repairs and debt payments."

[3] 1843 no report found. Tonnage coal given for 1843 in report 1844, 212,150.

[4] "Tolls, rents, fines."

[5] Spring flood and "extensive injury."

[6] Only partly opened.

[7] Figures taken from First Annual Report of the Delaware Division Canal Company. Other figures from the Reports of the Canal Commissioners of Pennsylvania. The figures given in the report of the company for the income in the years 1851–66 do not agree exactly with those given here from the reports of the Canal Commissioners.

Chapter IV.

THE DELAWARE AND HUDSON CANAL.

While the Erie Canal through the north of the State of New York was still in process of construction, a project was formed to construct an important canal in the south-eastern portion of the state. In contrast to the great state works, this canal was planned from first to last as a purely private interest, and relied for its support, not upon the general development of the resources of the country through which it passed or to which it gave access, but to the development of a particular interest—the coal industry. It was one of the projects which had the marketing of coal on the eastern seaboard as its prime object. All other trade was a welcome supplement, but was expected to remain of only secondary importance.

The Delaware and Hudson Canal Company owes its beginning to the enterprise of Maurice Wurtz and his brothers, Charles and William, all of Philadelphia. The coal deposits which were first owned by the company were brought to the attention of Mr. William Wurtz soon after the War of 1812. Mr. Wurtz often made trips into north-eastern Pennsylvania, and it is said that it was while fishing on one of these excursions that he "came upon a vein of anthracite coal." "He was very much struck with the value of it, and when he returned to Philadelphia he induced his brothers to come up and look at it."[1]

---

[1] Statement by Thomas Dickson, president of the company, in speech, November 16, 1875, published in "Memorial of the Excursion to Montreal given by the Delaware and Hudson Canal Company upon the occasion of the opening of the New York and Canada Railway, Nov. 16, 17 and 18, 1875." New York, Baker and Godwin, 1876. Hereafter referred to as "Memorial of the Excursion."

As a result of this investigation applications were made to the Legislatures of Pennsylvania and New York for authority to improve the river navigation so as to permit the marketing of the coal. The Pennsylvania Legislature in the session of 1822-3 passed[2] "an act to improve the navigation of the River Lackawaxen," giving "Maurice Wurtz, his heirs and assigns" authority to improve the river "by any device whatsoever" "to make a good descending navigation at least once in every six days" for boats of ten tons. It was further provided "that no toll shall be demanded for any boat . . . unless the improvement is converted into a complete slack-water navigation." Tolls were to be allowed at the rate of "12½c. upon every ton of the ascertained burden of (any) boat" "passing through any lock erected by them." Such navigation, it was stipulated, must be completed within ten years.

The New York Legislature passed the act of incorporation[3] April 7, 1823. The charter granted in New York was perpetual.[4] Besides full authority for the construction of a canal from tidewater on the Hudson to the Delaware River and up the Delaware River to the mouth of the Lackawaxen, the company had been granted banking privileges by the State of New York, through a supplement to the original charter. By this provision $500,000 of the capital stock might be used for banking purposes for twenty years. In order to better control the trade upon which the success of the undertaking was to depend the company decided, even before building the canal itself, to further extend its activities by buying coal mines tributary to the canal. With this object the coal lands of Maurice Wurtz were bought in 1825 for $40,000 and $200,000 deferred stock. Besides the trade thus secured, the company looked forward to an important supplementary trade in ornamental and building stones, timber, lime and clay. The promoters proceeded promptly to carry out their plans. A detailed survey of the proposed route of the navigation was made by John L. Sullivan and other engineers.[5]

---

[2] Report of .... Engineers ...... of the ...... proposed canal from the Hudson to the ...... Lackawanna. Philadelphia: John Young, 1824, p. 44.

[3] Census of 1880, and Report of the Engineers of the Company, p. 70, (Act certified, April 23).

[4] Report of 1825.

Public confidence in canal enterprises was strong at the time the Delaware and Hudson Company attempted to float its undertaking. The books were opened for subscription to the $1,500,000 capital stock of the company on January 8, 1825, "at the Tontine Coffee House (New York), and before two o'clock the whole amount was subscribed."[6] This made available to the company the banking privileges granted in the law, and on January 25, 1825, "the treasurer was in possession of a sufficient sum to authorize an entry of this appropriation in the books of the company."[7]

The original plan, which included a navigation partly by canal and partly by slack-water, was successively changed to discard the use of slack-water navigation and then to substitute for an improvement to consist exclusively of a canal, one formed in part by a canal and in part by a railroad.[8] The route was divided by the engineers into half-mile sections, to be sublet to contractors. The first thirty-four sections were advertised to be let on the thirteenth of July, 1825, and the actual work of construction was begun on that day by the breaking of ground at the summit level, 40 miles from the Hudson River, by William Howe, of New York, President of the Board of Managers, "in the midst of a great concourse of people assembled for the occasion."[9]

[5] Report of the Engineers, pp. 1-34.

[6] Niles Register, 30, p. 336, Jan. 22, 1825.

[7] Report for 1825.

[8] See report of 1825.

[9] Niles, 28, 356, Aug. 8, 1825. See report for 1825 and Memorial of the Excursion, p. 17.

At the banquet which followed the ceremony the following were two of the toasts which were drunk, "The Delaware and Hudson Canal, posterity will celebrate the anniversary of its commencement as a new era in the history of improvement." "The health of a citizen of a sister state, Maurice Wurtz, Esq., whose mind first conceived the project of the Delaware and Hudson Canal, and whose ardor and perseverance have brought the work to an auspicious commencement."[10]

At several times later in that year sections were contracted for between the summit and the Hudson River, and on December 6th all the remaining sections between Rondout on the Hudson and Montgaup on the Delaware, being sixty-five miles, were let. This included the hardest part of the canal. The water supply was also gotten by a modification of the original plan by introducing the Neversink River capable of furnishing a descending supply to both the Hudson and the Delaware. Throughout the period of construction it was the plan of the company to keep the exact route of the canal unknown to the public. This policy was adopted in order to encourage the offers of gratuitous cessions of land by property-owners along the proposed routes.[11] For a private undertaking, the size of the enterprise was notable, "the largest undertaking that had ever been entered into upon the continent by any corporation."[12]

The work of construction was vigorously prosecuted. In 1825 five hundred men were put to work on the canal,[13] a number which is reported to have risen to 1,000 by October 1st of that year, the average wages being $12 to $14 a month.[14] The following year we read, "The Hudson and

[10] Niles, 28, p. 356, Aug. 8, 1825.

[11] Report of 1825.

[12] Memorial of the Excursion, p. 17.

[13] Report of 1825.

[14] Niles Register, 29, p. 68, Oct. 1, 1825.

Delaware Canal goes bravely on; 2,500 men and 200 teams are at present employed on it, and more are wanted. It is hoped to complete it this season."[15] This was, however, too much to expect, even with the energetic prosecution given the work by the managers, and almost a year later we read again, "The Delaware and Hudson Canal . . . is navigable from the Delaware to the Hudson" The "remainder, from the Delaware . . . to the Lackawaxen" is "to be completed during the present season,[16] in spite of numerous leaks and trouble with porous earth which allowed large quantities of water to escape.[17] In August we read "Boats are now passing upon this canal,"[18] and in October, 1828, Philip Hone finally notifies the Senate of New York that the whole line of the canal is completed and the railway is well under way. The state having granted a loan of its credit to the amount of $500,000 in 1827, when the company was financially embarrassed, he also invites a committee of the Senate to inspect the canal and see how the loan on the credit of the state was put to use.[19] The directors of the company took justifiable pride in the economy and dispatch with which the work had been done and claimed that it was "without a parallel . . . for rapidity and cheapness . . . in our country."

The first coal boats actually making use of the canal did not pass through until the following year in February (1829), when it was announced, "The first squadron of boats with coal arrived at tidewater on the 5th instant."[20]

It is interesting to notice the means adopted to bring the coal to the canal over that part of the route where a waterway had been found to be impracticable. The company decided to install a railroad, which they believe "may be near as cheap as canals," in transporting goods.[21] The estimated cost per ton per mile by railway is placed at $.018, by canal $.015. While the railway was under construction some other means of transportation for the coal had to be temporarily provided. Turnpike communication was made from the mines at Carbondale to the head of the canal. From twenty to thirty teams were employed carrying coal at $2.25 per ton on sledges and $2.75 per ton on wheels. This brought the cost of coal to the company at tidewater to $4.75 or $5.25, according to the method of transportation to the canal. The coal found a market at $8 per ton at the company's wharf.[22]

---

[15] Niles, 30, p. 239, June 3, 1826.

[16] Niles, 32, p. 323, July 14, 1827.

[17] Report of 1827.

[18] Niles, 32, p. 406, Aug. 18, 1827.

[19] Niles, 35, p. 131, Oct. 25, 1828.

[20] Niles, 35, p. 433, Feb. 21, 1829.

The railway built to substitute the turnpike was of simple character. It was planned to carry only 540 tons per day one way. A substructure of timber was faced "with rolled iron plates securely fastened to the . . . rails with screws."[23] The plates were bought in England, where a saving of $18,000 was made on an order of 360 tons.

In explaining the abandonment of the original plan for an "all canal improvement," the directors again assert that railroads will prove "their near approach to canals in respect to cheapness and facility of transportation." For use on the railroad, the "company imported from Europe in July, 1829, the first locomotive engines ever (used) in America."[24] One of these engines, the "Stourbridge Lion," was placed on the road at Honesdale on the eighth of August of that year,[25] but was not a success in operation.

The handicaps under which the company worked during the first decade of its active operations were numerous.

---

[21] Report of 1827.

[22] Third General Report of the President and Managers of the Delaware and Hudson Canal Company, March 1, 1828. New York: Elliott and Palmer, 1828.

[23] Third General Report, p. 8.

[24] The Summer Tourist, 1880, Rand, Avery & Co., Boston, p. 26.

[25] Memorial of the Excursion, p. 67.

During the early years it had the general prejudice against anthracite coal to work against and, with other producers, had to make strenuous efforts to create a market; added to this, in 1830, the mistake was made of sending down a large quantity of inferior surface coal,[26] which prejudiced the public against the Lackawanna product in particular. In 1834 came a period of hard times, with currency fluctuations and the attendant stringency in trade circles.[27] The next year an overstocked market reduced profits below expectations, in addition "combinations and turnouts among the laboring classes" interfered with regular production, and 1837 brought a more acute stage of financial fluctuation. These conditions prevented the declaration of any dividends before the 40's. At one time, indeed, the stock sold as low as 40 per cent.[28]

In 1831, really the second year of operation (the first year for which any tolls are reported), the tolls on merchandise other than that of the company reached $19,394.05, on the canal, and on the railroad, where "tolls" were also charged, $1,160.59. This represented a miscellaneous tonnage of merchandise, manufactured lumber, cement, plaster, hoops, poles, staves, rough stone and brick, amounting to 11,872 tons, and a shipment of 7,964 cords of firewood, 2,882,800 feet of lumber and 233,000 feet shingles.

This general traffic in these early years formed an important percentage of the total, but the income from it never equaled the expenses of canal repairs and superintendence. The chief advantage of the canal was drawn from the first from the means of transportation furnished to the company's own product—anthracite coal. The tonnage of coal on the canal, even in 1831, reached 52,578, or over four times that of the general traffic, a disproportion which steadily became greater.

---

[26] Report for 1831.

[27] Report, 1834.

[28] Memorial of the Excursion, p. 17.

The conduct of the Delaware and Hudson Company in fixing prices, like that of the Lehigh Coal and Navigation Company, was the subject of much criticism almost from the beginning of the coal trade. In 1831 a loud outcry was raised against the fixing of the price of coal at $8 per ton when the president of the company had declared in a letter to the State Legislature that the cost of 50,000 tons at tide would be but $3.25 per ton.[29] Only two months later the company refused to deliver coal except at the higher price stated above.[30]

To counteract the prevalent prejudice arguments were published by the stockholders showing the great expense of the work necessary to bring the coal to market, the reasonable tolls charged on the railroad (35c. per ton for sixteen miles) and the great benefit the company had brought to Pennsylvania, where it had transformed Carbondale in three years from a wilderness into a town of 600 souls.[31]

THE PERIOD 1840-1860.

The two decades following 1840 form a period of increasing prosperity for the company. Even in the early 40's, when trade throughout the country was much depressed the expanding coal market assured a steady demand and substantial profits. It was during this period, too, that the company made the greatest progress along the lines upon which it was originally planned—that is, the development of the joint enterprises of their canal and their coal mine holdings.

---

[29] Letters, January 26, 1829, quoted in "Exposition" cited below.

[30] Exposition of the Objects and Views of the Delaware and Hudson Canal Company, by Investigator, 1831, March. No printer.

[31] Views of a stockholder in relation to the Delaware and Hudson Canal Company. No printer. 1831 (?).

1. *Canal Equipment and Improvement.*

The original plan for the canal was to provide a navigation of four feet depth suitable for carrying boats of thirty tons. Experience soon showed that these facilities were too small to give the best results. The boatmen, through whom the transportation was carried on, could not be secured at wages lower than $1.34 per ton per trip, and even this did not secure steady men, but the boats were often abandoned, to the serious interruption of traffic.[32] By increasing the size of the canal it was hoped that better wages might be possible for the men and also that the rate of freight might be reduced. With this object a plan for enlargement was adopted in 1840. The banks were to be raised and strengthened with materials taken chiefly from the bed and berm side of the canal. In this way a depth of five feet was to be secured, which would allow the passage of forty-ton boats. The actual work of enlargement begun in the fall of 1842 was finished in 1844, and the effect was immediate. The boats built for the four-foot capacity were enlarged by simply raising the sides. The average cargo rose to $40^{18}/_{20}$ tons by 1844. The average freight cost fell to $1.03 per ton in 1843 and to 97c. per ton in 1844, representing a direct gain for the two years over a similar tonnage at the rates in force in 1842 of $163,429.40. As the cost of the improvement had reached only $108,438.87, it had already paid for itself during the years in which the construction had been going on and besides earned a surplus of over $50,000.

Such signal success naturally led to further projects of enlargement. In 1845-6 the depth of the water was increased to five and one-half feet, giving a capacity to float boats of fifty tons. The trade again responded to the new conditions, cargoes rose to average $49^{13}/_{100}$ tons in 1846 and freight rate fell to 91¼c. per ton. The boatmen, too, were better able to make a living, and did not abandon their craft as formerly.[33] Next the size of the locks received attention, and by 1850 the average actual cargo rose to ninety-eight tons. Then came a project to deepen the canal to six feet, which was carried through in 1851-3, making the average actual load of the larger boats in 1851 106 tons and the capacity per boat in 1853 140 tons.

---

[32] Report of 1846.

2. *Railroad Equipment and Extension.*

Meanwhile the railroad equipment to supply the canal with coal was being quite as rapidly improved. As originally constructed, it was to carry 100,000 tons annually, but this capacity was soon outgrown. In 1836-7 an entire change of both location and arrangement of part of the road was made to enable the substitution of water power for horse power. On a second section the location was changed to give greater gradient to loaded cars, increase the capacity and shorten the distance. Five stationary engines were used to move the cars on this portion of the road. A third section was left with horse power, though it was so improved as to save one-half of the former expense. One section of six miles had a uniform gradient of forty-four feet to the mile, and loaded cars went the whole distance by gravity. On the return trip the cars were pulled back by horses. On other portions of the road, nearly level in character, horses still had to be used as a motive power in both directions.

This arrangement was in turn soon outgrown and the road was remodeled in 1842-4. Horses were found to be very expensive motive power and locomotive engines required a kind of road that would be very expensive to build, so the plan was adopted of building a track for the ten miles above Honesdale, which should have a uniform gradient of forty-four feet per mile. This would of itself solve the problem of transporting the loaded cars on the down gradient. A special second track was built for the return of the empty cars and stationary engines were installed to draw up the cars to such elevations as to enable them also to run by gravity from one engine to another. Five engines were at first required for the ten miles. It was found, however, that due to the abundant water supply, water wheels could be substituted for the engines, and by 1846 three of the engine stations had been thus superseded.

---

[33] Reports of the company for the respective years.

The lower portion of the Lackawanna coal field was now receiving attention, and in 1847 the Washington[34] Coal Company started to build an independent railroad to connect that section with the canal. This was the first important opening of the canal to other coal mining companies and paved the way to make the tolls on the canal a substantial source of revenue, both from the increased shipment of coal and the increased miscellaneous traffic that would be drawn over the route.

Under the provisions of the act of March 13, 1823, the State of Pennsylvania reserved the right to assume control of the part of the canal in that state at the end of thirty years, the property to be paid for at an appraised value. On the third of April, 1851, the House of Representatives appointed a commission to investigate the question of how much the state would have to pay to avail itself of its option. They reported on January 8, 1852, that $1,246,437.64 would have to be paid to the company, "that being the difference between the amount of tolls received and the cost of construction and repairs." The company asserted that a much larger amount would be due. The state, however, decided not to proceed with its claim, and on April 30, 1852, the Legislature gave up its right to resumption by repealing the section of the law which allowed it. By this action the charter of the company over the Pennsylvania section of the canal became perpetual, as it had always been over the portion lying in New York.[35]

[34] Report of 1847

[35] Report of 1852.

The canal company through the fifties also continued improving their own road and extending it to tap their various holdings of coal lands.[36] In 1859 the Legislature of Pennsylvania passed a bill giving the company a general permission to build whatever roads were needed in addition to those already built, to connect their holdings with the main plant. In the same year also the company started an extension of its road to within one mile of Scranton—a branch which was completed in 1860.

FINANCIAL OPERATIONS 1840-60.

That the period from 1840 to the Civil War was a prosperous one for the company is shown also from a review of their financial experience. By 1843 all outstanding bonds were paid without any increase of the capital stock, and the company had no debt except the state loan[37] The following year the banking privileges which had been of marked value to the company in its early years[38] lapsed by the expiration of the time for which they had been granted.[39] For several years previous, indeed, the company had not thought it expedient to exercise this privilege, and made no other use of it than to circulate its own bank paper in its canal and coal payments. By 1845[40] the bank circulation had all been redeemed with the exception of $17,081, and at the March meeting of that year an increase of capital stock provided funds, one of the objects of which was to redeem the bank capital altogether.

On January 1, 1848, the company repaid the state's loan of $500,000,[41] and on January 1, 1850, the last loan of

[36] Report of 1858.

[37] Report of 1843.

[38] Report of 1827.

[39] November 19, 1844. Report of 1844.

[40] Report of 1845.

[41] $480,371.32 was really paid at that date, the certificates for the remaining $19,628.68 not being presented. Report for 1847.

Statistics of Operation on the Delaware and Hudson Canal Company, 1840–60.

Year	Coal sent by Delaware and Hudson. Tons (2)	General Merchandise not including Lumber Trade. (1)	Tolls on the Delaware and Hudson Canal and Railroad.(3)
1829	7,000	......	....
1830	43,000	......	$16,422.44
1831	54,000	......	20,554.64
1832	84,600	......	28,717.51
1833	111,777	......	37,004.58
1834	43,700	......	36,946.07
1835	90,000	15,087	41,976.82
1836	103,861	16,332	45,154.73
1837	115,387	19,269	44,832.42
1838	78,207	27,499	40,328.38
1839	122,300	29,674	40,095.26
1840	148,470	25,193	35,450.46
1841	192,270	29,999	39,388.19
1842	205,253	21,283	33,894.93
1843	227,605	19,292	30,996.53
1844	251,005	22,547	33,525.61
1845	273,535	26,737	25,880.91
1846	320,000	28,242	26,068.65
1847	386,203	41,177	38,971.34
1848	437,500	51,954	46,548.54
1849	454,240	54,260	34,817.95
1850	432,339	64,332	97,999.15
1851	472,478	53,952	158,441.96
1852	497,839	62,909	293,174.67
1853	494,327	75,139	378,479.83
1854	438,406	62,084	587,349.52
1855	565,460	69,836	652,362.94
1856	499,650	70,068	583,737.86
1857	480,677	72,715	435,198.44
1858	348,789	79,756	307,698.11
1859	591,000	87,985	311,597.79
1860	499,568	95,210	397,677.99

[1] The lumber trade is given in cords, number (shingles) cubic feet and board feet, hence can not be stated in tons. By 1860 it reached almost 25,000,000 feet.

[2] This represents the coal marketed from the company's property.

[3] The chief cause of increase after 1850 was through the trade of the Pennsylvania Coal Company (see below).

the state's credit, amounting to $300,000, was also repaid, leaving the company free from debt. This condition was not to last long, however, as the railroad extensions of the fifties brought the funded debt up to $900,000,[42] and in 1859 further extensions necessitated an issue of $600,000 coupon bonds. This represented the total indebtedness of the company at the end of the period.

The profits to the stockholders during this period were also highly satisfactory. Notwithstanding the increase of capital stock to $7,500,000, the average dividends were almost as great at the end of the period as at the beginning. Starting with 11 per cent ($211,233.90) in 1840, they reached 22 per cent (634,645.45) in 1847 and 18 per cent $1,298,895.38) in 1855, dropping to 5½ per cent ($420,650.09) in 1858, due to the causes elsewhere noted.

THE PERIOD OF THE CIVIL WAR.

The experience of the Delaware and Hudson Coal and Navigation Company during the Civil War was one of prosperity far beyond that which it had uniformly enjoyed in the preceding twenty years of peace. During the period of great national distress covered by the years 1860-67 the dividends rose to far above the high water mark of 22 per cent, reached in 1847. Starting in 1860 with 7 per cent, they rose to 9, 11½ and finally 34 per cent in 1863, the darkest year of the war. Then the capital stock was increased from $7,500,000 to $10,000,000, but nevertheless, the profits for 1864 were 31 per cent (they would have been over 40 per cent if capital stock had not been increased); for 1865, 23½ per cent; for 1866, 27 per cent, and for 1867, 16 per cent. This showing was possible in spite of strikes in the midst of the season's work in 1860 (68 days)[43] and in 1865 (70 days),[44] depression of business due to the war, especially in the local trade on the canal, ruinous competition bringing the "lowest (prices) ever known in the history of the trade;[45] freshets closing the canal for almost one-fourth of the season in 1862; and the diversion of a large amount of trade from the canals to the railroads in 1864. Notwithstanding these disadvantages, the coal trade of the company throve as it never had before. The greatest tonnage in the history of the company was shipped in 1861,[46] and that of 1862 exceeded every year but 1861. "In view of the present state and prospects of the coal trade," say the directors in 1862, "there is every reason to hope for a profitable business" for the coming year. In 1863 "the demand for coal throughout the year was greater than the producing and transporting companies had the power to supply and prices ruled very high," and in 1864 "the demand for coal continues active at prices fully equal to the opening rates of last year." As a whole the Civil War was a period of the greatest prosperity the company had ever known.

---

[42] Report of 1858.

[43] Report of 1860.

[44] Report of 1865.

One other incident in the history of the company should be mentioned in this period, though it begins earlier and ends after the period has closed. This is the dispute with the Pennsylvania Coal Company.

In 1849 an agreement was entered into with the Pennsylvania Coal Company by which the Delaware and Hudson Company were to receive and market all their coal at tide-water. To aid in this the Pennsylvania Coal Company furnished 250 large size coal barges. The first year of operation under this contract (1850) proved less profitable than had been expected, as the company shipped only 111,014 tons, an amount much less than had been planned. The next year also the results were unsatisfactory to both parties and the agreement so far as it related to marketing the coal was canceled. Up to this time the relations between the two companies, though not such as each had hoped, gave no cause for dispute. In 1853, however, the enlargement of the canal was completed. In the agreement entered into by the companies in August, 1847,[47] it was stated that when the canal was enlarged certain additional tolls would be chargeable. A disagreement now arose as to the meaning of the clause, especially as to what coal should be subject to the additional charge. This was a matter of importance, as the amount of coal shipped over the canal by the Pennsylvania Coal Company was growing rapidly, the tolls reaching $326,150.49 in 1853 and $541.378.07 in 1854, exclusive of the additional charges claimed by the Delaware and Hudson Canal Company. In 1856 the dispute was given over to judicial determination, as provided by the terms of the agreement. The suit dragged on for years, while the claims of the Delaware and Hudson company constantly became greater, exceeding $600.000 in 1858, $800.000 in 1859, and $1,100.000 in 1860. In 1863 a decision was arrived at by the court "by which 5c. per ton was awarded to us (the Delaware and Hudson Canal Company) for every ton transported on our canal since July 28, 1853." "We are entitled under this decision for back tolls with interest (to)

---

[45] Report of 1862.

[46] Report of 1861.

---

[47] The agreement was originally made with the Wyoming Coal Association, Aug. 1, 1847. This association had been formed June 24, 1847, to mine coal and transport it to the canal by a railway. The Delaware and Hudson Canal Company was to contribute $300.000 to the capital stock of the Wyoming Coal Association. The Pennsylvania Coal Company built the railroad referred to for the Wyoming Coal Association, and all the rights of the latter company were transferred to it. The Delaware and Hudson Canal Company agreed to observe the contract with the Wyoming Coal Association as binding between it and the Pennsylvania Coal Company by an agreement of July 29, 1851. Copy of an agreement between the President, Managers and Company of the Delaware and Hudson Canal Company, and Wyoming Coal Association, and an agreement between . . . . the Delaware and Hudson Canal Company and Pennsylvania Coal Company. New York: W. C. Bryant, 1853.

$350,000."[48] The following year the Pennsylvania Coal Company, the tolls on whose coal had become an ever more important part of the income of the Delaware and Hudson Company reaching in total $954,822.67 in 1863 and $1,213,570.46 in 1864, decided to withdraw the greater part of its patronage from the Delaware and Hudson Company, and the second year following transferred it *all* to the Erie Railway Company. Whatever may have been the merits of the dispute which led to this action, it was highly unfortunate for the Delaware and Hudson Company that no amicable settlement could be arrived at, for the tolls receipts on the canal sank at once from $1,213,570.46 in 1864 to $201,679.38 in 1865 and to $118,482.95 in 1866, when the traffic of the independent coal company was almost entirely removed. In these two years the company lost much more than the entire amount of their claim for extra toll and the tolls sank from about two and one-half times the expenses for repairs and maintenance of the canal to little over one-fourth those expenses.

THE POLICY OF EXPANSION, 1867.

The year 1867 marks a complete change in the policy of the Delaware and Hudson Canal Company. We have seen that the company was never in the true sense a *canal* company, but at least a *canal and coal* company or perhaps more exactly a coal company operating a canal. The developments of the next few years were to change it into a coal company, with heavy holdings in railroads and owning a canal, and finally into a railroad company owning mines.

The fact that the Pennsylvania Coal Company could afford to transfer its traffic from the canal to the Erie Railroad was significant. It indicated a great change in the conditions of transportation, the ability of the railroads to compete successfully with the canals even in the lowest classes of freight. The half apologetic claim of the directors who when they built a railroad from Honesdale to Carbondale declared their belief that railroads would prove "near as cheap as canals," was to be more than justified.

---

[48] Report, 1864.

The interruptions in canal traffic due to drouths and freshets which came from time to time were negligible in comparison to those arising from the fact that canal transportation could be counted on at best for but eight months of the year, and that the market reachable was limited by the water courses. Added to this, the realization that the railroads could compete with the canals even on the ton mile basis made it clear that a company which wished to keep and extend its markets must avail itself of the same advantages possessed by its competitors.

The first step toward expansion grew out of a contract made in 1866 with the Union Coal Company, by which the Delaware and Hudson Canal Company agreed to transport a large quantity of coal for them. Later it was thought best to aid the company in purchasing the Baltimore Coal Company at Wilkesbarre by a loan of $1,300,000. In January, 1867, the Union Coal Company became involved in financial difficulties, and the Delaware and Hudson Company absorbed all their properties for $2,650,000. This brought into its control an additional 3,000 acres of coal land in fee and 1,100 under lease, besides seventeen miles of railway with equipment, furnishing an outlet through Scranton, and about 100 canal-boats.

At the close of the year another coal estate at Plymouth, opposite Wilkesbarre, was purchased for $1,575,000. This included 803 acres of coal land in fee and 225 under lease, besides a short railway and a bridge over the Susquehanna connecting with the line on the east side of the river. With these new resources at its back the plan of the company was to widely extend the market for its coal.[49] The directors report, "We have heretofore confined our operations almost exclusively to the sale of coal at tidewater . . . in our recent purchases we have aimed to get into such a position that we might be able on equal terms to reach any market open to our rivals." "We are already sending coal down the Susquehanna to Baltimore and along the lines of the roads connecting Wilkesbarre with Jersey City, and we expect next year to have facilities for placing coal in the great and rapidly developing market of the west." To handle the traffic under the new conditions the managers recommend in addition, doubling the capacity of the locks on the canal, widening the gauge on the railroad to the same as that of the connecting railroads and the substitution of locomotive power for the gravity system below Carbondale. To provide funds for these changes the stockholders increased the capital stock at the next meeting to $15,000,000. In 1868 also a contract was made with the Erie by which the latter agreed to build a branch road to Carbondale from their main line, thus opening a market to the company in Rochester and Buffalo. Arrangements were made also by which the railroad was to carry coal at reasonable rates from Honesdale to Weehawken Dock. In return the Delaware and Hudson Company guaranteed the identity of its interests with those of the Erie by purchasing from it $1,500,000 of the first mortgage bonds of the Boston, Hartford and Erie Railway Company at 90 per cent of par, to be paid as fast as the Erie should build the branch road referred to.[50] Another branch, the board recommends, should be built to Nineveh, on the Albany and Susquehanna Railway, to open up the market reached by that road. By the improvements, it is explained, "We shall obtain direct and easy access to important inland markets from which we are now practically shut out, we shall on the other (hand) be placed in a position to use the valuable facilities afforded by our contract with the Erie Railway Company in addition to the

---

[49] Report for 1867.

[50] Report, 1868.

full capacity of our own canal in supplying the rapidly growing demand upon the seaboard for our coal." The first argument is undoubtedly sound, the latter does not appear so good, for, except the advantage gained by the marketing of coal during the winter, the additional facilities offered by the Erie were surely not needed, as the "full capacity" of the canal had never been approached, especially since the diversion of the trade of the Pennsylvania Coal Company. The contract with the Erie for transporting coal from Honesdale to Weehawken, paralleling the service given by the canal, is the best example of the complete departure of the company from the old policy of supplying a market by a canal supplemented by railroads to one of supplying all markets inland as well as seaboard. To meet the great demand east and north of the mines, the directors declared, in 1869, that the delivery facilities had to be improved, either by "enlargement of the canal, involving a large expenditure, or by the possession or control of a railroad line running nearly parallel therewith." Enlargement of the canal would give increased capacity, only possession of a railroal would open markets otherwise practically closed to the canal and protect the company from competition "that might have seriously affected the value of our present improvements."[51] For this reason the company acquired in 1869 the Albany and Susquehanna Railway in perpetual leasehold for an annual rental of $490,000, or 7 per cent on capital and bonded debt of $7,000,000.

In the same year a contract was made with the Northern Central Railway Company of Pennsylvania for the transportation of coal from Wilkesbarre to Baltimore and intervening points.

A severe drouth in 1870 practically cut off all business on the Canal after September 1st and emphasized the advisability of securing more reliable means of transportation. The branch railroads from Carbondale to Scranton and from Susquehanna on the Erie Railway to Nineveh on the Albany and Susquehanna were put under construction, and the one from Carbondale to Susquehanna completed. The following year the perpetual lease of the Rensselaer and Saratoga Railway Company was carried through, the Delaware and Hudson Canal Company agreeing to pay the interest on the funded debt and 8 per cent on the stock. The Nineveh to Susquehanna branch was completed, and in 1872 the New York and Canada Railway, to tap the Montreal market, was put under construction.[52]

---

[51] Report of 1869.

The Delaware and Hudson Company was thus in the full swing of its expansionist projects when the country was struck by the financial panic of 1873. The panic had its effect both on the coal product which the company could sell and upon the traffic over the newly-constructed and leased lines. The capital stock was increased to $19,539,485.68 in 1873 and to $20,000,000 in 1874 to cover the obligations incurred and a loan of $5,000,000 negotiated in London. The coal tonnage fell off (with the exception of 1875, when strikes in the Lehigh and Schuylkill regions brought unexpected returns) and the general traffic on the leased lines decreased, causing a heavy yearly loss upon them from 1876-80, and arousing severe criticism of the policy which prompted their acquisition. Strikes in the mines, unrestrained competition of rival companies and freshets on the canal complicated the situation and produced positive losses as the result of all operations of the company in '77, '78 and '79. Notwithstanding these discouraging conditions, the work on the New York and Canada Railway which had been undertaken was pushed to completion in 1876. With 1880 conditions began to improve again. The deficits caused by the years 1876-9 were cleared up,[53] the policy of restriction of output discussed later was enforced, and with the revival of business dividends began to be paid again.[54]

---

[52] From 1872 on the reports become very summary in character and do not, as before, give any sketch of either the policy or the detail of the business.

[53] Report, 1880.

With the period at which we have now arrived the canal and its affairs have become but of incidental importance in comparison with the larger interests of the company—coal and railroads. With the report of 1872 all statistics of the canal traffic disappear from the reports, the account of maintenance and repairs for the canal is no longer separately entered, and the only mention of the canal found regularly in the reports is the entry of "canal tolls" in the income sheet. Before going on to sketch the later history of the company and the final abandonment of the canal the traffic upon it will be separately considered.

General Merchandise Traffic Other Than Coal.

When the canal was first constructed, though it was intended that its chief use should be the transportation of coal,[55] the company expected it to have an important development as an artery of general trade.[56] It did, indeed, before the development of the railroad net, serve to bring to the inland communities, not only commodities from the markets, but also immigrants. In the early 30's the canal was "the only line of transportation which emigrants could take from New England to Northeastern Pennsylvania."[57]

Even as early as 1829 "Regular lines of packets (were) running on (the) canal from Kingston to Honesdale,[58] and by 1831 "much merchandise (was) passing into Pennsylvania by the canal."[59] The effect of the canal is also shown by the statement that "the first reduction in the price of wood commenced in . . the first season of navigation between the Hudson and Delaware, and (wood) is now cheaper than it has been for twenty years."[60]

---

[54] Report, 1880.

[55] Report, 1827.

[56] "The agricultural products and the return supplies of a large extent of country must necessarily find their conveyance on the canal." Report for 1835, p. 10.

[57] Hon. Galusha A. Grow, ex-Speaker of the House of Representatives, in Memorial of the Excursion, pp. 43-5. He stated also that he went by the canal with his widowed mother and three brothers, "taking a canal boat that ran as far as Honesdale."

[58] Niles, 37, p. 130, Oct. 24, 1829.

The trade from New York, westward into northeastern Pennsylvania was aided also by the monopolistic policy followed by the Lehigh Coal and Navigation Company in the management of the general merchandise trade over its route. This policy, it was claimed, aided materially in developing the trade to New York over the Delaware and Hudson Canal at the loss of the towns of southeastern Pennsylvania, especially Philadelphia.

"In a few short years," declared a committee of a convention held at Conyngham in 1833, to petition the Legislature for freer communications, "Philadelphia will find herself deprived of the trade of all Northern Pennsylvania."[61]

The general trade was not to develop, however, as the promoters had hoped,[62] and the canal was unable to maintain its hold upon the lighter traffic. After the first development the more valuable articles decline in quantity. Only in the heavier articles, such as cement and cement stone, stone, brick and lime, is there a permanent trade over the canal. These articles show a gradual increase in amount up to the time when the statistics cease to be given (1872).[63] Lumber also formed a fairly stable article of shipment. The amounts and kinds sent seem to reflect somewhat the progress of the cutting

---

[59] Niles, 40, p. 307, July 2, 1831.

[60] Niles, 39, p. 384, January 22, 1831.

[61] Report of a convention held at Conyngham on July 4, 1833. Printed in Report of the Committee of the Senate of Pennsylvania upon the subject of the Coal Trade. Harrisburg, 1834: Henry Welsh, Printer.

[62] See report of 1835.

[63] See table.

TRAFFIC ON THE DELAWARE AND HUDSON.

Year	Coal sent by the Delaware and Hudson. Tons	General Merchandise not including Lumber Trade. Tons	Tolls on the Delaware and Hudson Canal.[63b]
1861	726,644	61,568	$367,953.56
1862	644,100	67,616	316,376.97
1863	828,150	82,595	954,822.67
1864	852,130	98,652	1,213,570.46
1855	759,699	113,545	201,679.38
1866	1,391,674	128,125	118,482.95
1867	1,507,487	133,812[63a]	96,530.05
1868	1,991,870	133,812	89,846.57
1869	....	194,059	96,865.01
1870	....	199,972	95,101.52
1871	....	219,921	111,361.38
1872	....	217,562	86,970.51
1873	....	No entries.	75,374.05
1874	....	....	66,593.86
1875	....	....	58,309.48
1876	....	....	43,444.59
1877	....	....	44,313.14
1878	....	....	39,099.69
1879	....	....	41,025.73
1880	....	....	42,810.30
1881	....	....	58,400.71
1882	....	....	60,007.52
1883	....	....	52,403.39
1884	....	....	47,240.26
1885	....	....	54,551.38
1886	....	....	58,410.34
1887	....	....	66,505.45
1888	....	....	56,674.56
1889	....	....	59,586.97
1890	....	....	58,183.49
1891	....	....	55,570.10
1892	....	....	65,025.05
1893	....	....	52,728.54
1894	....	....	40,372.93
1895	....	....	42,335.78
1896	....	....	44,515.17
1897	....	....	51,470.76
1898	....	....	50,933.79
1899 ceased operating	....	....	19,747.92

[63a] After 1867 the figures include the traffic on the railroad connections. The figures on the canal alone are not available.

[63b] Includes in the early years the tolls on the short railroad tributary to the canal.

down of the forests, as shown in the rapid disappearance of the pine, the comparative decline of hemlock and the increase of hardwood lumber.

RESTRICTION OF OUTPUT.

One of the policies of which the Delaware and Hudson Canal Company was always an advocate was the restriction of output by agreement among the great producing companies. The disadvantages of overstocking the market were apparent as soon as any market had been established.[64] The Delaware and Hudson Company consistently contended for the justice of agreements to prevent overstocking. In 1846 the directors complain that the "uncompromising hostility to each other" of the rival coal companies has done much to hinder profits,[65] a condition continuing in 1847.[66] Again in 1851, "The two companies through whose works the coal of the Schuylkill region is brought to market entered into a violent contention for business," "which caused a loss to all companies in the coal trade."[67] In 1877 also the reports complain of the "suicidal policy of forcing large quantities of coal upon overstocked markets," and rejoice that at last it has "been arrested by an arrangement of the producers to limit the supply to the demand"[68] by an agreement of January, 1878. The agreement did not work satisfactorily, however, and was formally dissolved December 2, 1878, and in the next year "product was sacrificed . . in the struggle for precedence," and "positive loss to the owners resulted."[69] In the latter part of the year, however, the owners again agreed to limit the production, and in March of 1880 a "restrictive policy was successfully put in operation," which continued with great success through 1884. "Under (this) policy the mines (of the company) were closed forty-eight days during the year" (1882); sixty days during 1883 and 103 days during 1884. Under this plan "the surplus . . steadily increased." In 1885 the agreement again broke down, much to the regret of the managers. Even without the agreement the results of operation are not such as to call forth criticism, though the managers again decry the coal war then going on. In 1892 also "harmonious action on the part of producers" reigns, to be succeeded by "a struggle for victory and triumph rather than profit" in 1895.

---

[64] See Report, 1835.

[65] Report for 1846.

[66] Report for 1847.

[67] Report of 1857, also similar in 1862.

[68] Report of 1877.

[69] Report of 1879.

These quotations indicate the consistent attitude of the company upon the question of restriction of output. It may be noted in this connection that these complaints were made at all times when cutting of rates was practiced. although, judging from the actual profits of the company in the years noted, no great suffering in dividend-paying ability seems to have been experienced. In 1846, 20 per cent; 1847, 22 per cent; 1851, 6⅜ per cent; 1862, 11½ per cent; 1877, loss; 1891, $7^{35}/_{100}$ per cent; 1895, 6¾ per cent were paid. These do not compare badly with the years of "harmonious action"—1878, loss; 1880, 6¾ per cent; 1881, 10½ per cent; 1882, $9^{2}/_{10}$ per cent; 1883, 10 per cent; 1884, $6^{5}/_{6}$ per cent; 1892, $10^{11}/_{100}$ per cent.

The history of the Delaware and Hudson Canal Company for the last thirty years is a record of railroad expansion and of exploitation of coal mines. Only incidentally does the *canal* itself enter into the traffic carried by the company. The larger operations of the company have also been accompanied by great increases of capital stock (total, $23,500,000 in 1884, $30,000,000 in 1891, $35,000,000 in 1894.

In 1887 the company acquired a controlling interest in the Rutland Railroad in Vermont, running from Burlington to Bellows Falls, 120 miles, thus opening up a new field for the consumption of the company's coal.[70] This road was later leased to the Central Vermont Railway Company, from whom it returned through a receiver to the Delaware and Hudson Canal Company in March, 1896. In 1898 the company's interest was sold for cost, plus 4 per cent interest. In 1889 the controlling interest in the Adirondack Railway Company was bought and paid for and part of the track between Saratoga and Whitehall was double tracked, a work completed and paid for in 1896.

The policy which led to the leasing of the various lines now under the control of the Delaware and Hudson Canal Company did not have the whole-hearted support of a portion of the stockholders, and the results of this branch of the company's business can hardly be said to be wholly satisfactory. In the years 1875 to 1899 the operation of the leased railroads resulted in a net loss in the years 1875-80, 1884-87; 1891; 1894-6 and 1898. It should also be said, however, that the roads have been much improved in character under the management of the company,[71] and, as the managers point out, have enabled the exploitation of the resources of coal to an extent which would probably have been impossible had the management of the railroads been in independent or hostile hands.

The extent to which control of the railroads was accompanied by a control of the coal market may be indicated by the following quotation from the report of 1879, showing shipments of coal by the Delaware and Hudson Company:

From Honesdale via Canal and Railway	1,933,874	tons.
South from mines	56,278	"
Erie and west	583,665	"
North via Albany and Susquehanna	357,673	"
Local	122,900	"
Total by Company	3,054,390	"
Transported for other parties	357,673	"
Total	3,412,063	"

---

[70] Report, 1887.

[71] Report of 1888, quoting New York Railroad Commissioners as to improvements in the roads.

But little over one-tenth of the coal entering this region by the railroads mentioned was therefore shipped by interests unallied with the company. It is to be noted that the company before leasing the lines confined its business almost entirely to shipping to the seaboard.

It remains to notice the fate of the canal during this period of the company's history. Statistics of traffic are lacking, but the general decline can be indicated by the meager information yielded by the reports. In 1895 a combination of freshets and drouths did damage to the canal traffic to an extent "unprecedented in our history," and two years later the company took action which showed that the canal was no longer considered as the valuable asset it had once been. The contract with the Erie Railroad, by which it had become the carrier of a large portion of the company's coal, expired[72] and was renewed "on terms advantageous and satisfactory to each of the contracting parties." At the same time the following entry appears:

"Your managers have decided to charge off to your 'general profit and loss' account a portion of the cost of the following accounts: Canal, $639,210.49; boats, $213,664.60; equipment, $200,000; total $1,052,664.60; (various smaller items) $211,814.19; in all $1,264,689.28." This amount was subtracted from the surplus. The action was only the first step toward the final abandonment of the whole canal system. The following year:[73] "Your manager, after careful consideration, decided that it would be greatly to your interest to cease operating the canal. The cost of transportation by that route is too great as compared with other methods, and the increased earnings will, it is believed, much more than compensate for the change. The cost of the canal has therefore been charged off and no longer stands as an asset on your books." As a part of this policy the equipment of the gravity road, valued at about $800,000, was marked off the books, as also other properties valued at about $2,340,323.12[74]

---

[72] Report, 1897.

[73] Report, 1898.

As a result of this action, the formal existence of the "Delaware and Hudson Canal Company" ceased, and the title "The Delaware and Hudson Company" was assumed.[75] The abandonment of the canal, it is reported (1899), "has proved greatly to your interest, and the enhanced earnings are due in great extent to such action." In this year a final charge against surplus on the account of the canal is entered, amounting to $266,694.76, representing "boats, canal supplies, machinery, tools, etc."

The gravity road from Honesdale to Carbondale was turned into a steam road of the same gauge as the connecting railroads (1900), thus completing the alteration in the transportation equipment of the company.

A final change taking place in the relative importance of the different branches of the company's business is shown by the action taken in 1899 at the annual meeting in regard to establishing a sinking fund for the coal account. An ordinance then passed providing for "the gradual retirement of stock and bonds of the company contemporaneously with the mining and sale of the coal" and for "crediting thereto each year upon the books of the company a sum equal to not less than five cents for every ton of coal mined by the company," which "sums shall be charged against the profits for the year." The canal had done its work; provision was now to be made against the future exhaustion of the company's coal resources. This action indicates the shifting basis of the business of the company. The railroad first thought of as "near as cheap as the canal" has crowded its old competitor out of the race and already promises to supersede in importance the coal business which was originally the cause of the formation of the company.

[74] Report dated 1898.

[75] Report, 1899.

CHARACTER OF GENERAL TRAFFIC ON THE DELAWARE & HUDSON CANAL.

Year.	Cement and Cement Stone.	[2]Merchandise and Provisions.	Leather, Hides.	Stone, Brick and Lime.	Total.	Thousand Shingles.	Hardwood Lumber.[4]	Pine and Basswood.	Hemlock.	Cordwood.	Lumber Unclassified.
1831[1]	2	7	..	1	11	233	......	.....	......	7	2,882
1832[6]	....	...	..	...	...	....	......	.....	......	...	......
1833	....	...	..	..	...	....	......	.....	......	...	......
1834	....	...	..	..	15	....	......	.....	......	...	11,184
1835[6]	....	...	..	..	...	....	......	.....	......	...	......
1836[6]	....	...	..	..	...	....	......	.....	......	...	......
1837	....	...	..	..	19	....	......	.....	......	...	......
1838[6]	....	...	..	..	...	....	......	.....	......	...	......
1839	14	...	..	..	29	620	1,647	3,521	3,691	...	......
1840	....	...	..	..	25	491	1,137	2,363	2,818	...	......
1841[6]	....	...	..	..	...	....	......	.....	......	...	......
1842	....	...	..	..	21	....	1,271	2,243	2,524	...	......
1843[6]	....	...	..	..	...	....	......	.....	......	...	......
1844[6]	....	...	..	..	...	....	......	.....	......	...	......
1845	....	...	..	..	26	....	1,324	898	5,324	...	......
1846	13	15	..	..	41	....	2,004	776	8,837	...	......
1847[6]	....	...	..	..	...	....	......	.....	......	...	......
1848[6]	....	...	..	..	...	....	......	.....	......	...	......
1849[6]	....	...	..	..	...	....	......	.....	......	...	......
1850[6]	....	...	..	..	...	....	......	.....	......	...	......
1851	17	19	5	3	53	75	2,274	1,119	11,008	...	......
1852	25	18	5	4	62	557	2,254	1,225	15,807	...	......
1853	32	16	6	6	75	338	3,961	1,853	22,768	...	......
1854	24	17	5	5	62	373	2,406	750	15,274	...	......
1855	29	16	6	5	69	158	3,266	254	16,056	...	......
1856	29	14	6	7	70	194	3,031	520	12,785	...	......
1857	35	12	7	4	72	468	4,308	603	10,586	...	......
1858	46	12	8	3	79	54	3,973	426	9,239	...	......
1859	51	15	8	2	87	153	3,770	484	16,225	...	......
1860	57	15	7	3	95	132	4,370	464	18,947	...	......
1861	35	11	5	2	61	46	2,540	106	13,147	...	......
1862	36	14	6	2	67	88	3,165	347	12,413	...	......
1863	42	17	7	3	82	555	3,188	705	12,187	...	......
1864	51	17	7	5	98	276	3,075	[3] 385	10,083	...	......
1865[5]	53	15	7	5	113	135	4,329	935	9,347	...	......
1866	74	20	7	11	...	273	5,510	620	12,986	...	......
1867	75	20	7	17	133	210	5,351	634	13,340	...	......
1868	84	21	5	24	133	79	6,306	973	12,269	...	......
1869	113	19	5	43	194	135	3,678	852	16,538	...	......
1870	109	20	3	51	199	167	4,369	1,270	11,605	...	......
1871	121	19	2	55	219	341	8,942	289	13,807	...	......
1872	130	15	1	51	217	486	6,066	789	9,575	...	......

---

[1] In this table items above 1,000 tons and items above 10,000 board feet are entered. Figures are in thousands of tons except lumber which is thousands of feet, (shingles entered by the thousand).

[2] Beginning with 1856, this item till then be entered as "Merchandise" becomes "Merchandise and Provisions."

[3] In this year this item till then entered as "Pine" becomes "Pine and Basswood."

[4] In 1868 and 1869 this item is entered as "Hemlock Wood" in the place where Hardwood lumber is usually placed. Since the item "Hemlock" occurs again below in these lists we have assumed that it is a typographical error.

[5] In this year there is an entry of 22 thousand tons of Manufactures of Wood. The item drops to less than 1,000 tons the next year.

[6] No statistics available.

CHAPTER V.

THE MORRIS CANAL.

The Morris Canal, connecting the Delaware at Easton with New York harbor, was begun in the height of the enthusiasm for internal development which swept over the country in the first quarter of the last century. From the first it was realized that the main reliance for trade would have to be anthracite coal from the Lehigh region, but it was hoped also that it might secure an important part of that trade to the West which was to be tapped by the state canals of New York and Pennsylvania. Indeed, the Morris Canal itself was at first thought of as a state enterprise.

In the fall of 1822 a meeting was held at Morristown, New Jersey, to discuss a canal through the state from Easton to New York. The governor and many "other distinguished citizens" were present and discussed the various routes. Glowing, if not accurate, pictures of the service to be rendered by the canal were presented. It would supply "New York with Lehigh coal at one-half the price it now pays for Liverpool coal" and the "whole expense (would be) at most $400,000." State ownership was strongly urged because of the large profits to be reaped, because the "Legislature will not grant a corporation good terms in New Jersey," and because "we ought to be subjected to no influence and be under no control save that of our representatives."[1]

---

[1] Niles' Register, Sept. 14, 1822, quoting a correspondent in Philadelphia, Sept. 6. Report of the commissioners appointed by the Legislature of the State of New Jersey for the purpose of exploring the route of a canal to unite the River Delaware near Easton with the Passaic near Newark. Morristown, Jacob Mann, 1823 (hereafter referred to as "Report of the Commissioners"). "Lehigh coal (is) . . the foundation upon which the chief utility and profit of the enterprise must rest," also "The chief object is . . to open a communi-

The plan was presented to the Legislature the following year and a committee appointed to look up the possibilities. However, the dominant idea of the Legislature in making its investigation of the possibilities of the canal was not, as in the similar movements in New York and Pennsylvania, the improvement of the general welfare, but to obtain a substantial source of income from the monopoly of the anthracite coal carrying trade, which it was felt would inevitably come to the canal. It was the idea of the state from the start to make the canal an investment directly profitable to itself.

In 1823 a commission of three was appointed by the State Legislature "to explore various lines across our state and select that which seemed fittest for a canal."[2] The Commission visited the New York and Lehigh Canals and conducted an exhaustive investigation of the natural resources to which the waterway would give development. Besides the valuable Pennsylvania coal trade to New York, they reported that a great traffic would come from New Jersey itself. "The north (of the state) contains a subterraneous wealth of more solid importance than the treasures of any equal portion of the globe . . inexhaustible supplies of iron, zinc and lime, with copper, black-lead, copperas, manganese and the finest marbles, Spanish brown and yellow ochre await only the proposed canal."[3]

So glowing did the prospects seem that "the state, with full power in its hands, should . . reserve for itself the enormous advantage and trifling risk of the plan."[4] The greatest concession that could be made was to allow private capital to invest in a minority of the stock, the state

---

cation between the coal . . on the Lehigh . . and the iron works of New Jersey, the manufactories of Paterson and the City of New York." Report of United States Engineers in report of the Commissioners, p. 66.

[2] Report of the Commissioners.

[3] Report of the Commissioners, p. 7.

[4] Report of the Commissioners, p. 14.

keeping the control of the policy of the waterway in its own hands.

This was also the opinion of the United States engineers, Brigadier-General S. Bernard and Major-General J. G. Totten, sent by Secretary Calhoun to review the project. "Canals," they report, "are of two classes: (1) Made with a view to the general interest, the revenue being a secondary object; (2) in which revenue is the principal object. The proposed Morris Canal belongs to the last class mentioned above."[5]

The State of New York also became interested in the project and sent Judge Wright, sometime chief engineer of the Erie Canal, to make the survey of the route with the New Jersey Commission. Governor Clinton also visited the whole line. He wrote to the Commission favoring the project and prophesying for it a brilliant future, concluding, "The work ought to be achieved by the state exclusively," otherwise the private capital necessary will necessarily come from abroad and "New Jersey will be bound hand and foot by the shackles of a non-resident company."[6]

Only one disadvantage, it was claimed, was present in the proposed route, and even that could easily be obviated. From the first investigation it was found "that the elevation of the summit level above Easton and the tide-waters of the Passaic (the termini first proposed for the canal) would exceed any idea formed upon the floating information previously acquired."[7] To overcome this extraordinary rise and fall locks could hardly be used, but it was thought that by use of inclined planes the passage could be made easy. Robert Fulton's statement that locks on canals would soon be abandoned in favor of inclined planes was quoted with approval. The problem in the Morris Canal was, however, greater than in the European canals of which Fulton spoke, because of the greater size of the boats. These could be handled it was asserted by an invention of Mr. Renwick, the engineer of the Commission, by which "Henceforth the most mountainous regions and the most appalling elevations will be traversed with ease."

---

[5] Report published in Report of the Commissioners, p. 63-4.

[6] Letter of Governor Clinton, New York, Oct. 24, 1823, p. 62. Report of the Commissioners. See also a notice of the trips of Clinton and the United States Engineers in Niles, 25, p. 134, Nov. 1, 1823.

[7] Report of the Commissioners.

The glowing report of the Commissioners must have struck the conservative reader as well ornamented with rhetoric and inspired by extraordinary confidence, to say the least. After appealing to state pride and the desire for gain, at length the Commissioners conclude with a warning. "The words 'Now or Never' may be emphatically applied to our system of internal improvement." The construction must be hurried through before the New York canals should get a grip upon the commerce of the West which could not be broken.

The hope of a state constructed waterway proved illusory, and the next year the Legislature, on December 31 (1824), passed an "Act to Incorporate a Company to Form an Artificial Navigation between the Passaic and Delaware Rivers." A supplement of the same date conferred upon the company the power to carry on a banking business.[8] For this purpose the company was authorized to increase the capital by $1,000,000 above what was needed for the canal; they were given also the power to "borrow money to any extent deemed proper," to execute and receive trusts and to buy and sell foreign exchange, to buy stocks and transact all business ordinarily done by banks. The banking privileges were to continue for thirty-one years, the rights in the canal for one hundred and fifty years, unless the State of New Jersey should elect to take them over at a fair price at the end of one hundred years.

---

[8] Further legislation during the period of construction: An act of Jan. 26, 1828, authorizing extension from Newark to the Hudson. An act of Feb. 23, 1829, authorizing the company to borrow money. An act of Jan. 23, 1830, authorizing mortgage of company's property and for other purposes. An act, March 10, 1832, for better protection of the Morris Canal.

The act of incorporation made "unlawful any canal within ten miles of any point of the main trunk of the Morris Canal without the consent of the company in writing under their common seal," the object being to cut off the possibility of any competing route in that portion of the state. The company was to have practically a free hand in the management of its property, as the state reserved no "special right of interference" excepting the payment annually of a tax of one-half of 1 per cent upon the capital of $1,000,000, and "an obligation on the part of the board to make a biennial report of the state of the company's affairs." On the whole it does not appear from the charter that the prejudice of the legislature against corporations above referred to hindered the grant of a charter of the most liberal sort.

The private company now in control opened its books for subscriptions in New York City in the spring of 1825, when the speculative fever was at a high pitch. In a single week twenty millions were subscribed for the stock of the company, the capital of which was by its charter limited to $1,000,000. This remarkable demonstration is commented on by Niles with his usual protest against risky enterprises. "It is strange that no sort of madness can break out in England without affecting us. . . Now we have it in stock companies. There will be a smash equal to that caused by the blowing up of the banks."[9]

The work of construction was begun in July.[10] By September the working force was reported as five hundred, and before the end of the month[11] thirty miles were under contract and seven hundred men at work.[12] The formal launching of the project took place at a meeting on October 15, 1825, when the board of directors, in the presence of "seven or eight hundred gentlemen," inaugurated the work on the feeder at the summit level,[13] two months after the similar celebration for the Delaware and Hudson project. The work of excavating was nearly completed by the beginning of 1829.[14]

---

[9] Niles 28, p. 147, May 7, 1825, the Report of the President and Directors, 1835, states that the amount offered in 1825 was "upwards of seven millions," and that stock immediately afterwards was at 20 per cent premium.

[10] Report of the President and Directors, etc., Company of 1844, dated March 17, 1848.

The promoters continued to hope great things for the canal and thought that "many years would not elapse before agricultural and manufacturing products, metals, lime, marble, lumber, slate and brick (would) monopolize (the) navigation, and when if . . coal (be carried) at all, it must upon a railway or additional canal."[15] The public at large was not so sanguine. In fact, in 1826, the year after the extraordinary subscription to the stock, the company was in financial straits—2,881 shares of stock were forfeited by the subscribers, a number which rose to 3,204 by 1828.[16]

The extraordinary rise and fall reported by the company as 1,730 feet[17] was forbidding, especially as 1,470 feet of this distance was to be overcome by the inclined planes, the adaptability of which for boats of the size for which the canal was planned continued to be a question.[18] In addition, the adequacy of the water supply was in doubt.[19] The enemies of the canal and the representatives of rival canal companies did not neglect the opportunity to arouse prejudice against the Morris Company, and a violent battle of words was waged up to the time of the completion of the waterway.[20]

---

[11] Niles 29, p. 24, Sept. 10, 1825.

[12] Niles 29, p. 28, Oct. 1, 1825.

[13] Niles 29, p. 158, Nov. 5, 1825.

[14] Niles 36, p. 3, Feb. 28, 1829.

[15] Annual Report upon the Morris Canal for the Year Ending July 1, 1826, New York: William Davis, 1826.

[16] Report of the Committee of Council and Assembly, appointed to view the Morris Canal and inclined planes, Jersey City, Dec. 13, 1828. In 1832 the company owned 4,000 of its 10,000 shares of stock. Report of a Joint Committee of the Directors and Stockholders of the Morris Canal and Bankng Company, New York, August, 1832.

[17] Annual Report, etc., 1826.

The excavation was continued, and by the end of 1828 the eastern section was almost completed to Newark.[21] By October, 1829, the first of the inclined planes was put in operation,[22] and boats were passing on the eastern end of the waterway by the end of the year.[23] A delay of almost two years occurred before the line was completely in operation. December 16, 1830, the first boat passing through Newark was reported, "the inclined plane being completed." To see one of the boats rise in the plane "was indescribably grand and beautiful." "The boats are now passing up and down the inclined plane every day."[24] In January, 1831, the fifty miles nearest Newark were in operation, "the inclined planes work handsomely" and "the charge for carriage of iron made at the works adjacent to the canal (was reduced) from $5 a ton to 50 cents.[25] The tolls for ten days amounted to $1,100.[26] The first trip from Newark to Easton, the whole line of the canal as then built, was completed November 4, 1831.[27]

---

[18] Niles 37, p. 124, Oct. 17, 1829. He also adds: "For ourselves we believe that a railway might as well have been constructed through the whole route."

[19] See Annual Report, etc., 1826.

[20] See an answer to Mr. John L. Sullivan's report to the Manufacturing Society in New Jersey, in a letter to the Morris Canal Company, New York, William A. Davis, 1828, and letter to John Wurtz, Esq., with Case and Opinion by a Stockholder of the Morris Canal, March, 1831, no publisher.

[21] Report of the Joint Committee, etc., 1828, gives details, and Niles 36, p. 3, Feb. 28, 1829.

[22] Niles 37, p. 124, Oct. 17, 1829.

[23] Niles 37, p. 277, Dec. 26, 1829.

[24] Niles 40, 159, April 30, 1831, quoting the New York American, Dec. 16, 1830.

[25] Niles 39, p. 329, Jan. 8, 1831.

The completion of the canal did not bring the hoped-for prosperity. The connection directly with New York was not yet complete, and the canal-boats were too small to allow towing from Newark. A loan of $750,000 had been floated in Holland in 1830, but no capitalist could be found willing to finance the completion to Jersey City. The stock fell to 20 per cent of its par value, and the company had difficulty in raising enough money to fit out boats for the traffic actually available. After being used a short time the chains in use on the planes, especially those of American manufacture, broke frequently, causing expensive delays, which discouraged individuals from buildings boats to be run independently.[28]

An attempt was made to float another loan in Holland through the agency of the house of William Willink, Jr., "bankers to the United States of America, negotiators of the first foreign loan to infant America,"[29] but the Dutchmen were suspicious of the banking privileges included in the company's charter. They would not be convinced that "The various disastrous reports and communications from New York" and "the depression of the value which the bonds of the $750,000 loan of 1830 have had in our (the Dutch) market," were without any tangible cause. "Why was the loan not made in America," they asked. "Your . . proposal of a sale of 5,000 shares . . at $200 each could not take effect, . . the prices in the New York market being known to be more than 50 per cent discount." The most that could be secured was a promise that a loan would be made if the company could prove its financial worth by showing a revenue of $100,000 for the year. One hundred thousand dollars was at last secured in London with which to buy boats so that enough traffic might be secured to insure the income demanded.[30]

---

[26] Niles 40, 405, Aug. 6, 1831.

[27] Niles 41, p. 225, Nov. 19, 1831.

[28] Report of a Joint Committee, etc., 1832, New York.

[29] Documents Relative to the Negotiations for a Loan to the Morris Canal and Banking Company, June, 1833.

Had not a few of the important stockholders staunchly stood by the company during these years it must almost surely have become bankrupt.[31] The next few years brought a return of confidence in the company. The supply of boats was increased; the total traffic rose from 56,281 tons in 1833 to 89,501 in 1834. A loan of $150,000 was floated in May, 1834, with which the work on the extension to Jersey City was pushed ahead. The Legislature of the state came to the aid of the company by authorizing, without a dissenting vote, an increase of $1,000,000 in the company's capital.[32]

In March of 1836 the company was granted a supplement to its charter, giving it the power to construct any necessary feeders and charge toll thereon, to farm out its water powers and to increase its stock by 6,000 shares. The boom then going on in financial affairs made the company apparently as prosperous as it had formerly been embarrassed. The additional $1,000,000 capital authorized by the act of January, 1835, was soon after "subscribed and fully paid to the company in specie or in notes of other banks equal to specie." In December, 1835, the board sold the forfeited shares held by the company, amounting to $1,134,000, at par. By June, 1836, the 6,000, $100 shares authorized by the supplement of March, 1836, were sold at face value, and the directors could boast that in one year they had been able to put the canal in a position to complete the works, to discharge all debts "from their own capital and resources" and still have $1,000,000 for banking purposes.

---

[30] Documents relative to the Negotiations for a Loan, etc., 1833.

[31] Report of the President and Directors of the Morris Canal and Banking Company, Jan., 1835, New York, Van Norden. See also A Brief View of the Important Relations of the Morris Canal with the Prosperity of the City of New York, undated, no publisher.

[32] Report of the President, etc., 1835.

Prosperity of this sort was illusory, and the panic of 1837 brought disaster to the company. A complication of circumstances made the crisis especially acute. Bonds to the amount of $750,000 fell due in London, large expenditures were being made on feeders, reservoirs, piers and coal landings, amounting in 1835-40 to $650,000, other internal improvements connecting with the canal cost $800,000 and large investments in state bonds were made in 1838 and 1839. These elements combined brought the company to the verge of bankruptcy in 1840.[33] It struggled on trying to enlarge the canal from its original capacity—25-ton boats—to carry 54-ton cargoes. The channel was to be deepened and the lift-locks enlarged. This latter improvement was finally completed 1840-1, but immediately afterward the company went into the hands of a receiver, by whom it was leased till the end of 1844 for a low annual rental. In October, 1844, the canal and all its property were sold to satisfy a mortgage. The purchasers reorganized the company as "The Morris Canal and Banking Company of 1844," issuing stock and scrip to the full amount authorized by the charter.[34]

The improvements started by the old company were continued and, though still incomplete, the canal was put into use in August, 1845. Even yet competition on even terms with the Delaware Division-Delaware-Raritan waterway was impossible, notwithstanding the directness of the Morris route. The lack of depth and the inadequacy of the inclined planes made improvement essential. The company

[33] Report to the stockholders of the Morris Canal and Banking Company, 1840, Jersey City, Dec. 31, 1840.

[34] Report of the President and Directors of the Morris Canal and Banking Company of 1844, dated March 17, 1848, New York.

had purchased one hundred new boats of sixty to sixty-five tons capacity in 1845, but they could not be passed over the planes when loaded with more than fifty tons. The inclines had originally been built for twenty-five ton loads, but were of wood and decayed and often broke even under that weight. There were about one hundred boats of the twenty-five ton type called "flickers," owned by individuals, in operation on the canal since its enlargement, but the delays and small loads discouraged independent investment. Even the new planes could take the larger boats only one section at a time, and "the average time . . to pass loaded boats up them was . . at the rate of about two boats per hour . . one-quarter of what could be passed by the lift-locks."

Such conditions evidently prevented the Morris Canal from ever becoming a great avenue of through trade. Even the coal carried was chiefly for the local markets. In 1847, 61,951 tons entered the canal from the Lehigh Valley, but of this only 17,885 reached Newark. There was up to 1840 no profit on the canal trade to tidewater. An effort to improve the waterway, especially the inclined planes, was started in 1847. A sample plane was constructed which could handle seventy tons net cargo, taking the load up 51 feet and forward 900 feet in three and one-half minutes. This was faster than the ordinary speed of towing. An attempt to get a further loan on mortgage bonds to carry on the improvements failed in 1848.[35] The company's need of resources was recognized by the Legislature in 1849 in a further supplement to their charter. They were authorized to reduce the number of shares of stock and issue preferred stock to be distributed pro rata, each share after the reorganization to have one vote. In return the company surrendered its banking privileges.[36]

---

[35] Report of the Board of Directors, etc., 1849.

[36] Further supplement to the act entitled An Act to Incorporate an Artificial Navigation between the Passaic and Delaware Rivers, approved Feb. 9, 1849.

The grant of these additional resources and the improvement they made possible mark a turning point in the history of the company. It had never, up to this time, been a real factor in the carrying trade. Except during the periods of speculation in which the project was started and the two years preceding the panic of 1837, it had always been in financial difficulties. The reorganization of the company and the new resources obtained in the preferred stock issue placed it on a firmer basis.[37] For the first three years the operations continued to show losses. Then came a gradual improvement.

Year	Earning of the Morris Canal	Loss on Business	Profits on Business
1845[1]..................	$ 18,997.45	$ 1,039.87	....
1846[1]..................	55,019.23	31,922.74	....
1847[1]..................	73,264.87	41,843.80	....
1848..................	....	....	....
1849..................	100,418.70	....	$40,383.16
1850..................	109,173.22	....	45,930.01
1851..................	116,297.92	....	64,285.23
1852[2]..................	143,690.68	....	83,729.64

[1]Report 1848, others from reports of respective years.

[2]Includes "Tolls and other sources," chiefly small water power rentals. For tolls in subsequent years, see general table.

The new planes were replacing the old ones and the banks of the canal were raised so as to increase the capacity "at least fourfold." The planes west of the summit, where the chief lifting was to be done, were rebuilt first. By 1856 fifteen had been remodeled, leaving only eight to be done, and a depth of five feet of water was attained. These improvements at once had an effect on the tonnage and toll receipts. Boating facilities, in spite of continued efforts on the part of the company to increase the equipment by offering bounties, etc., continued to be insufficient.

---

[37] The liabilities after the reorganization were $1,542,242.21. Report, 1848.

This difficulty the company hoped to obviate by connections with the Lehigh Valley Railroad, established in July, 1854,[38] and by arrangements with other roads, especially the Delaware, Lackawanna and Western and the Warren Railways.[39] Through using these railways for the carrying of coal from the mines to the canal at Port Delaware the Morris boats could be kept on the canal continually, and thus make more trips than when obliged to go up the Lehigh Navigation to Mauch Chunk.

Compared to the situation before the late improvements the condition of the canal was indeed encouraging. The supplement to the charter granted in 1849 had given the company increased resources which enabled the managers to quadruple the former capacity of the waterway. Five feet of water were maintained and boats could be passed carrying sixty-five to seventy tons.[40] Unable formerly to pay the interest on its obligations, it could now do so, make payments on the indebtedness and meet the dividends of 10 per cent guaranteed on its preferred stock. At the same time, too, enlargements of the coal yards at Jersey City and improvement of the transshipping facilities at Port Delaware were undertaken. By 1859 the various improvements along the canal had been completed and a capacity of 1,000,000 tons was obtained.[41] The sale of the Delaware Division Canal by Pennsylvania also helped to make the outlook favorable, for, while the state had remained in control, "It was found impracticable for the Morris Canal to obtain anything like a proper proportion of the tolls which the coal would bear from the mines to tidewater." Consequently, when the private "company was about to be organized for the purchase of that canal," a number of the stockholders of the "Morris Company became largely interested in that purchase," several of them "participating in its management as directors." This arrangement secured "an approximation to a proper proportion of tolls upon that branch of their business."[42]

---

[38] Report to the Stockholders, etc., 1855.

[39] Report to the Stockholders, April 7, 1856.

[40] Report of April 7, 1856.

[41] Report April 4, 1859.

The alliance of these two companies placed the coal trade through New Jersey by canal practically under the control of one company, since the Delaware and Raritan had to depend chiefly upon the Delaware Division for its supply of coal going eastward. The outlook for the Morris Company at the opening of the Civil War was encouraging. The period of the Rebellion proved to be one of prosperity for this as for the other coal carrying canals. "The rather unexpected activity in the coal trade,"[43] "the unusual activity in the iron works"[44] and in manufacturing interests in general[45] brought an increasing traffic. The price of coal rose and tolls were raised correspondingly,[46] but the total tonnage rose from 554,034 tons in 1858 to the high-water mark of 723,927 in 1864. More coal was offered than the boats could carry, though they were pressed to the limit of their capacity, the coal tonnage rising from 350,331 tons in 1859 to 459,175 tons in 1866, an increase which, with the rise in tolls, brought the dividends of the company to the highest point in its history. Even the severe flood upon the Lehigh which crippled the canal in the height of the season of 1862 and through the damages to the loading facilities at Mauch Chunk hindered trade even after the canal was repaired did not interfere seriously with the Morris traffic, for the railroad connections at Port Delaware were able to deliver most of the coal formerly brought down by the waterway.[47] The preferred stock regularly received its 10 per cent dividend, and the "consolidated," long unremunerative 1½ per cent in 1858, 3½ per cent in 1863, 10 per cent in 1864 and 1865, and 8 per cent in 1866.

---

[42] Report dated April 4, 1859.
[43] Report dated April 7, 1862.
[44] Report dated April 6, 1863.
[45] Report dated April 4, 1864.
[46] *Ibid.*
[47] Report dated April 6, 1863.

But this period of prosperity—the first indeed which the Morris Canal had ever enjoyed—was to come to an end as suddenly as it had arisen. Neither increased carrying capacity nor the combination to control rates could eliminate the competition of the railroads which recently the feeders, were now to become the competitors of the waterway. The beginning of this development came in 1866, when the Morris and Essex Railroad commenced carrying coal to a part of the territory before tributary to the canal. The managers report, "This road will now become a strong competitor for the way trade hitherto transported on the canal, particularly that of coal and iron."[48]

The competition of the railroads was foreseen by the company and measures taken to counteract its effect. Lock improvements[49] and the deepening of the canal to six feet were started so as to enable boats to pass carrying one hundred tons in the effort[50] to retain the coal trade especially. Extra inducements were offered to try to keep the boatmen at work. The company itself bought horses and mules to be rented out to individual boat owners, so that less capital might be required for operating boats. Meanwhile a rate war was cutting down profits, necessitating lowering of tolls to maintain traffic—the rate per ton from Phillipsburg to tide was reduced from $1.70 in 1869 to $1.06 in 1870.[51] Under such conditions, the profits of former years vanished. In 1868 the dividends on consilidated stock were no longer forthcoming, and even that guranteed on preferred was paid in scrip bearing 7 per cent interest and redeemable in twenty years. The next year the preferred stock received only 5 per cent and in 1870 the dividends sank again, totaling only $58,750. The Legislature was petitioned for a supplement to the company's charter authorizing them to lease the canal.[52] The supplement granted was considered and accepted by the company on December 20, 1870. An offer to lease the properties for ninety-nine years, made by the Lehigh Valley Railroad, was accepted, and early in 1871 the independent existence of the Morris Canal Company came to an end.

---

[48] Report dated April 1, 1867.

[49] Report dated April 6, 1868.

[50] Report dated April 3, 1871.

[51] Reports dated April 5, 1869, and April 31, 1871.

The bargain on the part of the Morris Canal Company was, under the circumstances, a very acceptable solution of the difficulties in which it found itself. The railroad assumed the canal company's indebtedness and guaranteed dividends averaging 7 per cent a year on the preferred and consolidated stocks, the payment of $25,000 yearly to the State of New Jersey under the agreement of the canal company in return for a guarantee of certain rights to harbor privileges in Jersey City, and a "small sum for the maintenance of the corporation."[53] This income guaranteed was almost equal to the results of operation in the most successful year of the company's history and far greater than it could hope to gain under the new conditions rapidly approaching.

The purchase was made by the Lehigh Valley Railroad because their coal trade had "suffered for some years from the want of an independent outlet to tidewater." Under the Lehigh management, however, the canal never became an important highway of commerce. The chief advantage accruing to the company was not the trade on the canal, not the control of whatever competition the waterway might have been able to offer, but the possession of the canal company's terminal facilities, "a basin of about sixty acres with a frontage of 1,500 feet on North River opposite New York." This latter was, of course, with the growth of traffic, an asset of ever-increasing value.

---

[52] Report dated April 3, 1871.

[53] Report Lehigh Valley Railroad Company, Jan. 8, 1872.

The canal itself at once assumed a secondary rôle and never approached the tonnage carried under independent operation. The coal tonnage, its main reliance, had been a varying quantity since the highwater mark of 1866, but had never fallen below 300,000 tons till 1870, when the coal tonnage delivered to it fell to 197,769.[54] In subsequent years it never entirely regained the trade it had lost. In only two years, 1883 and 1884, did its tonnage again reach the 300,000 ton mark. The canal was never suited to become a controlling factor in the through trade to tide, and under railway ownership its through shipments soon practically ceased. In 1879 an agreement between the railroads for a division of tonnage caused a sharp falling off, as the company found it more profitable under the contract to turn its shipments as much as possible to the railroad. The following year the lack of an agreement as to rates brought back the tonnage somewhat, but tolls had to be lessened to meet the competition, and the income from the canal was not improved thereby. By 1888 the company reports that the trade on the canal is "almost exclusively" local, a condition which, in fact, has been the case almost since the purchase of the waterway by the railroad.[55]

Character of the Traffic of the Morris Canal.

The Morris Canal, on account of the remarkable rise and fall to be overcome, was never able to command the confidence of capitalists, as were the more favored routes, such as the Delaware and Hudson and the Lehigh canals. It struggled through its history hampered by both lack of depth and lack of facilities to handle freight with dispatch.

---

[54] Report Lehigh Valley Railroad Company, 1872.

[55] Lehigh Valley Railroad Reports.

In 1887 and 1888 the coal trade on the canal was divided as follows:

	1887.	1888.
Coal to tide	41,205	5,632
Coal to way stations	217,921	282,570

Indeed, it is not too much to say that the profits in the only period of its independent existence during which it paid dividends were due to exceptional commercial conditions rather than to the real advantages of the waterway. While its more fortunate neighbors were reaping harvests of 20 and 30 per cent, the Morris enterprise reaped but 10 per cent.

The failure to reap the hoped for profit was due first of all to the inability to handle the coal trade for the reasons already mentioned. Had the canal been built of the same capacity as the Lehigh, and had it been possible to handle the traffic economically by means of the inclined planes, the history of the most direct water route from the coal mines to New York would have been far different from the dreary succession of complaints on account of lack of funds, of bankruptcies and reorganizations. Failing to get and hold the through trade, the canal was forced to fall back on local trade as its chief source of income—a resource looked upon from the first as of only secondary importance. Nor did the local trade develop as was expected. The only industry which came to be of substantial importance to the canal income account was the manufacture of iron. In the local trade the transportation of coal for smelting, iron ore, cinders, manufactured iron and lime became the most important and steady source of income of the canal. The other trade consisted of a number of less important articles involving the local trade of the country through which the canal passes. The amounts are relatively constant throughout the period for which statistics are available—1845-70. The only articles showing marked variation in quantity are lumber, which reached an average of about 11,000 tons for the period of 1857-67, and "wood bark, etc.," traffic in which grew steadily from 5,003 tons in 1845 to 25,833 tons in 1866, after which it fell off to about 1,600 tons.

COAL TONNAGE RECEIVED ON THE MORRIS CANAL, LEHIGH-LACKAWANNA REGIONS.

Year	Lehigh Coal at Port Delaware			Scranton Coal at Port Washington	Aggregate
	Canal	Railroad	Total		
1845.......	12,567	....	....	....	....
1846.......	41,142	....	....	....	....
1847.......	61,951	....	....	....	....
1848.......	82,159	....	....	....	....
1849.......	103,482	....	....	....	....
1850.......	98,100	....	....	....	....
1851.......	137,237	....	....	....	....
1852.......	180,189	....	....	....	....
1853.......	222,582	....	....	....	....
1854.......	267,864	....	....	....	....
1855.......	290,730	....	....	....	....
1856.......	284,828	808	285,636	17,764	303,400
1857.......	227,652	13,047	240,699	43,599	284,298
1858.......	281,949	5,350	287,299	55,426	342,725
1859.......	255,405	5,780	261,185	89,146	350,331
1860.......	276,947	....	276,947	127,517	404,464
1861.......	272,616	1,401	274,017	140,922	414,939
1862.......	106,431	45,738	152,169	172,128	324,297
1863.......	208,397	48,234	256,631	145,815	402,446
1864.......	187,540	44,520	232,060	150,803	382,863
1865.......	217,933	74,052	291,985	124,204	416,189
1866.......	205,351	112,790	318,141	141,034	459,175
1867.......	171,266	107,206	278,472	146,359	424,831
1868.......	161,828	107,387	269,215	80,977	350,192
1869.......	78,787	134,570	213,357	68,269	281,626
1870.......	69,990	205,636	275,626	84,514	360,140

From the Reports of the Morris Canal Company.

COAL RECEIVED ON THE MORRIS CANAL FROM THE LEHIGH VALLEY RAILROAD.

Year.	Tons.	Year.	Tons.
1873	206,957	1882	295,443
1874	165,277	1883	300,697
1875	142,524	1884	308,552
1876	212,776	1885	281,335
1877	261,345	1886	298,256
1878	170,564	1887	259,127
1879	211,670	1888	288,202
1880	257,499	Entries cease.	
1881	298,951		

From the Reports of the Lehigh Railroad Company.

INCOME FROM TOLLS AND OTHER SOURCES ON THE MORRIS CANAL.

Year.	
1845	$18,997.45
1846	51,212.39
1847	67,687.09
1848	65,531.75
1849	90,220.48
1850	98,224.25
1851	110,730.56
1852	140,202.28
1853	187,449.71
1854	245,431.54
1855	272,125.23
1856	313,026.15
1857	286,668.61
1858	275,019.44
1859	$305,537.93
1860	350,710.63
1861	291,846.37
1862	303,154.39
1863	374,601.76
1864	590,393.26
1865	600,584.30
1866	616,350.36
1867	449,652.46
1868	423,476.30
1869	431,245.80
1870	391,549.76

Entries cease.

TONNAGE ON THE MORRIS CANAL.

(Only items over 1,000 tons noted here.) Figures from Annual Reports of the Company.

	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854	1855	1856
Bar and Pig Iron	5,795	11,356	16,940	16,556	25,978	23,789	23,003	29,201	31,973	18,978	32,291	36,375
Blooms and Billets	1,243	1,686	1,720	1,697	1,638	1,567	......	......	1,082	......	......	......
Brick	.....	1,429	2,122	3,775	1,987	1,069	......	1,884	2,187	7,056	3,224	2,856
Charcoal	.....	1,022	......	1,167	1,167	......	1,435	1,851	2,214	1,081	......	1,174
Clay, Earth, Sand, etc	2,466	5,127	6,621	4,825	2,329	6,365	10,117	12,373	39,553	5,842	49,278	26,272
Flour, Meal, Feed	1,635	3,420	2,419	4,319	5,189	5,508	3,533	3,278	4,170	2,263	2,614	2,945
Hoop-poles and Rails	.....	......	......	......	......	1,331	1,062	......	......	......	1,353	1,143
Iron Rails	.....	......	5,020	7,377	......	......	......	4,427	1,288	1,047	2,222	......
Lime	.....	1,804	1,764	2,528	2,163	1,944	2,965	2,627	3,356	4,243	3,546	3,519
Limestone	1,510	2,450	1,810	5,480	3,397	3,560	1,066	4,652	3,473	3,157	5,664	3,062
Lumber	1,516	2,856	3,364	5,450	5,938	6,761	5,546	6,765	11,022	12,002	12,834	11,613
Mineral Coal	28,221	47,947	67,068	89,879	114,017	104,323	148,262	190,277	235,805	284,606	299,682	311,929
Nails, Spikes, etc	.....	......	......	......	......	2,223	2,960	4,613	5,876	5,591	6,209	6,115
Ore and Forge Cinders	5,802	17,073	28,314	46,922	53,722	60,055	62,690	77,132	104,151	117,191	113,294	113,845
Plaster	.....	1,784	......	2,102	1,823	1,441	......	......	1,759	......	1,056	1,663
Timber and Logs	1,315	1,944	3,424	1,913	2,406	2,122	1,066	2,836	3,629	3,986	2,240	2,457
Wood, Bark, etc	5,003	6,766	6,010	6,605	5,325	9,499	9,918	9,503	8,042	9,816	13,139	14,303
And Others	.....	......	......	......	......	......	......	......	......	......	......	......
Total	58,259	109,505	155,559	204,682	234,305	239,682	281,707	358,797	467,288	543,269	553,204	563,386

TONNAGE ON THE MORRIS CANAL.

(Only items over 1,000 tons noted here.) Annual Report of the Company.

	1857	1858	1859	1860	1861	1862	1863	1864	1865
Bar and Pig Iron	32,847	20,115	20,136	15,815	11,970	22,203	28,949	23,402	18,407
Blooms and Billets	......	......	......	......	......	......	......	1,271	......
Brick	3,681	4,648	4,628	7,484	5,884	2,590	4,101	5,496	6,171
Charcoal	......	......	1,069	1,236	......	......	1,035	......	......
Clay, Earth, Sand	29,165	9,382	15,909	7,303	6,843	5,129	10,437	9,812	11,729
Flour, Meal, Feed	1,287	3,156	3,229	4,630	6,058	7,219	5,018	4,122	4,677
Hoop-poles and Rails	1,214	......	......	......	1,005	1,162	1,184	......	1,477
Iron Rails	......	......	1,113	......	......	......	......	1,051	1,467
Lime	3,372	3,702	4,285	5,545	5,376	5,839	4,532	2,899	3,019
Limestone	2,635	6,941	7,920	3,946	6,833	4,179	4,245	4,526	6,163
Lumber	12,085	8,243	13,750	13,809	6,948	10,107	12,519	11,055	12,953
Mineral Coal	298,011	356,297	365,861	422,552	426,080	355,660	413,452	393,030	428,180
Nails, Spikes	5,933	6,218	7,387	7,334	6,092	7,002	7,343	6,936	6,910
Ore and Forge Cinders	125,805	108,684	155,467	186,064	103,163	169,108	191,667	223,924	174,838
Plaster	1,229	1,655	3,075	2,165	2,639	2,260	2,636	1,565	1,439
Timber and Logs	2,562	2,345	6,066	5,476	3,737	4,660	4,085	4,469	8,110
Wood, Bark, etc	10,810	15,863	20,400	15,147	17,952	21,898	15,985	20,058	21,108
Castings and Machinery	1,790	1,044	......	......	......	4,768	3,045	1,353	1,108
And Others	......	......	......	......	......	......	......	......	......
Total	536,362	554,034	638,019	707,631	619,369	612,018	718,519	723,927	716,587

	1866	1867	1868	1869	1870	Entries Cease.
Bar and Pig Iron	13,334	12,984	17,064	12,612	15,473	
Blooms and Billets	......	......	......	......	......	
Brick	8,679	7,269	9,791	19,500	26,031	
Charcoal	......	......	......	......	......	
Clay, Earth, Sand	13,784	11,221	17,541	17,898	16,313	
Flour, Meal, Feed	5,316	1,484	7,516	5,705	6,032	
Hoop-poles and Rails	......	......	2,173	1,731	1,448	
Iron Rails	......	5,145	......	2,137	......	
Lime[1]	4,682	9,019	4,828	5,092	4,459	
Limestone	13,378	......	10,004	2,345	4,090	
Lumber	13,209	12,748	9,760	9,631	6,692	
Mineral Coal	473,028	437,088	359,097	304,365	371,579	
Nails, Spikes	8,193	......	4,486	6,416	7,973	
Ore and Forge Cinders	290,165	289,550	269,672	227,696	220,079	
Plaster	2,013	2,214	......	2,267	......	
Timber and Logs	5,555	3,798	4,380	5,166	3,929	
Wood, Bark, etc	25,833	16,606	16,993	16,835	11,386	
Castings and Machinery	1,078	1,079	3,135	......	......	
And Others	......	......	......	......	......	
Total	889,220	822,741	744,412	650,200	707,572	

[1] After 1866 entered as lime and cement.

Chapter VII.

THE SCHUYLKILL NAVIGATION.

Like the Lehigh, the Schuylkill early attracted the attention of those interested in opening up the back country. "Even in colonial times," it is said, "Dr. Franklin and other distinguished and patriotic men turned their attention to the subject of improving the river, but the magnitude of the work delayed the enterprise."[1]

When the construction was finally undertaken it was with a double object—to furnish an outlet to the seaboard for the agricultural and lumber resources of the Schuylkill Valley and to form a link in the great chain of improvements by which Pennsylvania sought to draw through her territory the all-important trade of the great west. Both projects were, of course, intimately connected with the commercial ambitions of Philadelphia, and it is therefore natural that the chief promoters of the enterprise were prominent Philadelphia business men.[2]

The first active measures to develop the waterway were taken in 1815. Then an application was made to the Legislature for a perpetual charter, which was granted on March 15th. The capital stock was fixed at $500,000, divided into 10,000 shares of $50 each. The governor was authorized to incorporate the shareholders whenever 2,000 shares were subscribed for and an instalment of $5 paid on each. This was accomplished May, 1815.[3] To the capital stock the state made a contribution of $50,000.[4]

---

[1] Report, etc., on the Improvement, 1845.

[2] Report of the President and Managers of the Schuylkill Navigation Company to the Stockholders, 1827. As early as 1812-13 White and Hazard, the men who carried the Lehigh project to completion, called a meeting in Philadelphia to consider the improvement of the Schuylkill, but when they applied to the legislature their plan was "ridiculed" and they got no charter. Hazard's Register, Vol. III, p. 302.

Before commencing the actual work of construction the managers "viewed" the improvements then in operation on the Connecticut, "one of the very few American streams made navigable by art."[5] Those in charge of the Connecticut improvements referred the visitors to Mr. A. Cooley, an engineer of Springfield, Massachusetts, who was engaged by the Schuylkill Company to survey and locate their proposed navigation. Cooley went over the route in April, 1816, and recommended the improvements in practically the form in which they were finally constructed. Work was begun at once. The canal was to be three feet deep and suitable for boats carrying twenty-five tons. The locks measured 80 by 17 feet. Soon after the construction was begun it was found that the sluices on a part of the line would not be sufficient, and a plan providing for a complete slack-water system was adopted.[6]

Work progressed slowly and was found much more expensive than originally estimated. Increased contributions had to be asked for repeatedly. A portion of the route was in use as early as 1818,[7] but the date of completion was still far away. In 1821 the president declared at least two years and "proper support" from the stockholders still necessary for the accomplishment of the work.[8] Without the support of Stephen Girard, of Philadelphia, "the wealthiest citizen in the United States," at this time, the canal would probably have failed of completion.[9] He repeatedly gave aid to the enterprise and "continued until his death to take a lively interest in the company." His stock, it is interesting to note, he left as part of the fund of which the City of Philadelphia was made trustee.[10]

---

[3] The Reading Railroad Company, their Policy, etc., 1844.

[4] Address of the President, etc., 1821.

[5] The Reading Railroad Company, their Policy, 1844.

[6] Report, etc., on the Improvement, 1852.

[7] Report of the Committee of the Senate, 1834, p. 9.

[8] Address of the President, etc., 1821. See also Niles, 26, 252, June 19, 1824.

[9] Position and Prospects, 1845.

On July 5, 1824, the twenty-two miles below Reading were formally opened as the Girard Canal, so named in honor of Stephen Girard.[11] Later seventy-five boats with 30,000 bushels of coal and other merchandise left Mt. Carbon for Philadelphia,[12] and by the end of the year many boats and arks were reported to have gone the whole distance to Philadelphia. Freight rates at once fell to less than one-third what they had been before.[13] The canal was not officially open to traffic, however, until October 1st of the following year.[14] The total first cost of the real estate and construction had by that time risen to $2,200,000, over four times the original estimate.[15]

When the project of the Schuylkill Canal was undertaken the coal trade "was not regarded as an object of much importance,"[16] though shipments had been made to Philadelphia before the beginning of canal construction at about the same time that Cist and Miner were trying to introduce into use their anthracite from the Lehigh region. As early as 1814 it is reported, "Last week (the Schuylkill being remarkably high) an ark containing 600 bushels of Schuylkill coal passed this place . . destined for the Falls or Philadelphia. This being the first attempt to convey this valuable coal by water to the city, we hope the enterprising proprietors may find it their interest to persevere in the undertaking."[17]

[10] Report, etc., on the Improvement, 1852.

[11] Niles 26, p. 302, July 10, 1824.

[12] Niles 27, p. 80, Oct. 2, 1824.

[13] Niles 27, p. 258, Dec. 25, 1824.

[14] The Schuylkill Navigation Company, 1852.

[15] Position and Prospects, etc., 1845.

[16] Report of the Committee of the Senate, 1834, p. 30.

[17] Niles 6, p. 152, Saturday, April 30, 1814, quoting correspondent in Norristown, April 13th.

Even before the completion of the navigation it had become plain that the coal trade would be an important factor in the traffic. In 1817 the managers express their belief that the traffic in that article may some day reach 10,000 tons per annum.[18] The anthracite, which it had been so difficult to introduce, had even by 1821 come into use to such an extent that the managers of the canal speak of "a great demand already existing" in Philadelphia.[19] Coal rather than the general trade formed the chief reliance of the canal, in fact, from the beginning. In 1827, practically the second year of effective handling of traffic, the managers report, "The great increase in the consumption of this valuable fuel is very important to the interest of the company," $33,317 out of a total receipt of $58,149.74 coming from the charges on the coal trade. The general trade for which the canal was built was thus practically from the beginning the less important factor.[20]

THE PERIOD 1829-42.

The fourteen years from 1829 to 1842 were a period of great prosperity for the navigation. During this time it became the greatest of the coal carrying routes, far outdistancing all its other competitors. It had an absolute monopoly upon the coal carrying trade from the Schuylkill region, for it was not until the latter year that the Reading Railroad began to cut in upon the business. The prosperity made possible by this monopoly made it possible for the company to boast in 1845 that through the thirty years of its history it had, with one exception, "never failed to meet its interest with punctuality or discharge faithfully every liability of its stockholders."[21] Public favor made the canal stocks one of the most prized of investments. They were eagerly sought by charitable organizations, as their security was considered unexcelled.[22] As early as 1829 they sold at 43 per cent above par, though that was the first year in which the stockholders received a return on their investments. Substantial dividends of from 9 to 24 per cent were received after the canal proved able to carry the coal traffic, and the $50 shares rose at one time to $175.[23] The ascending trade, which in 1825 had brought in only one-sixth of the total tolls, returned one-fourth in 1826,[24] and in 1830 two-fifths.[25] The policy adopted in 1827, by which coal tolls were lowered to stimulate that trade, proved a marked success, and in the event greatly augmented the company's income.[26] The Union Canal, tapping the Susquehanna trade to the west, began its contribution to the traffic with a shipment of about 1,000 tons over the Schuylkill Navigation in 1827.[27] The next year the tolls on traffic from this source formed almost one-seventh of the total income.[28] This increase was almost exclusively in "general traffic." The amount of trade from this source was materially increased after the opening of the Pennsylvania canals.[29] The proportion of the income thus derived fell off, however, after 1831, though the actual amount increased. This was due to the more rapid increase of shipments from the Schuylkill Valley and to the development of the coal mines. Numerous improvements contributing to the traffic of the canal were carried to completion during this period of monopoly. Lateral coal railroads tributary to the navigation were built,[30] and brought an ever larger coal tonnage.[31] These roads numbered seven by 1836.[32]

---

[18] The Schuylkill Navigation, 1852.

[19] Address of the President and Managers of the Schuylkill Navigation Company to the Stockholders, Philadelphia, 1821.

[20] Report, 1828; see also Report, 1829.

[21] Position and Prospects of the Schuylkill Navigation, 1845.

---

[22] The Schuylkill Navigation Company, 1852.

[23] Position and Prospects, etc., 1842; see also The Schuylkill Navigation Company, 1852.

[24] Report, 1827, p. 7.

[25] Report, 1830.

[26] Reports, 1828 and 1829.

[27] Report, 1828.

[28] Report, 1829, for 1828.

[29] Report, 1834.

This early period was marked by the prosperity of individual enterprise in the coal business. By 1833 there were forty-seven independent miners and shippers using the Schuylkill Navigation, besides 225 men who purchased from the miners and did shipping only. The size of the shipments during the year varied from 85 tons to 23,534 tons. Of the 580 boats on the canal 512 were owned by individuals and 68 by three companies. The working of coal as then carried on did not differ in amount of capital required from farming; indeed, many of the operators were or had been farmers.

Under the stimulus of increasing traffic, reservoirs were built to supply water during the periods of drouth.[33] The boats were increased in size from 30 to 35 tons to an average of 45 tons in 1835 and 55 tons in 1840.[34] The time required for a round trip from Mount Carbon was reduced from twelve or fourteen days to seven or nine. In 1835 the Danville and Pottsville Railroad was completed and began bringing coal to the canal. Some of the mines of this region, it is interesting to notice, were owned by the City of Philadelphia.[35] Various improvements in the line of navigation itself were also made, towpaths were improved, dams raised to give greater water depth, part of the canal near Reading was planked to stop leakage through the limestone bed, an experiment finally abandoned in favor of a new route for that portion of the canal,[36] and, most important, "combined" and double locks were substituted for the original constructions. These last two changes formed the largest single item of expense, necessitating an outlay of $453,677 out of a total of loans up to 1835 of $1,175,000.[37] In 1837 the plan was adopted of making all new locks correspond in dimensions with the Pennsylvania State Canal, so that when the Union Canal should be enlarged the same boats could pass freely upon all three routes.[38]

---

[30] Report, 1832.

[31] See Report, 1833.

[32] See Report, 1837.

[33] Reports, 1834-6 and 1839.

[34] Report of 1835. Some boats carried 58 tons in 1835, Report, 1836; Report, 1841.

[35] Reports, 1835 and 1836.

[36] Report, 1831.

The prosperity enjoyed by the company is indicated by a comparison of the anthracite coal tonnage on the various coal carrying canals touching the coal fields directly.

ANTHRACITE COAL TONNAGE.[39]

	1839	1842	1843
Schuylkill Navigation	442,360	491,602	447,058
Lehigh Canal	220,645	271,374	267,734
Delaware and Hudson	122,300	204,253	227,605
Union Canal via Schuylkill Canal	248	....	....
Reading Railroad from Schuylkill region	....	49,398	229,015

The Schuylkill Navigation had become not only the greatest of coal carrying canals, but carried about as much as all the other routes combined. By this remarkable development, of course, the trade far outgrew the capacity of the Philadelphia market, which had formerly been practically the sole place of consumption. The shipments which first came into prominence in 1826 had risen to over 350,000 tons a decade later, and only a minor fraction of the product was sold in Philadelphia.

[37] See general review Report, 1836, also 1837 and 1838.

[38] Report, 1838.

[39] See Reports 1840, 1843 and 1844, also general table, *post.*

DESTINATION OF THE SCHUYLKILL COAL SHIPMENTS.

	1836	1839	1840	1842
Coastwise "to distant ports".....	313,838	286,990	244,680	256,080
Philadelphia......	61,944	100,694	90,000	88,000
New York directly	....	27,000	64,388	126,554

The peculiar advantages possessed by the Schuylkill Navigation are shown also by the ability to compete in the New York market against the Lehigh, and Delaware and Hudson Companies, both of which were apparently in more favorable positions for getting that trade, which, indeed, was the main object of the latter enterprise. An important part of the coal shipped coastwise went to the metropolis, and, beginning with 1839, there was also a promising trade directly by canal-boat. Speaking of the beginning of this latter trade, the managers report:[40] "A new plan of operation has been commenced," "we allude to the shipping of coal, etc., from the head of the Schuylkill Navigation direct to the City of New York and other intermediate markets via the Delaware River and Delaware and Raritan Canal." "This method of transportation saved the time and expense of transhipment" "equal to about seventy cents a ton." In this trade the barges were towed from Pottsville to Philadelphia, where the horses were loaded on the barges and towed by a steam tug to Bordentown. From there the boats were drawn by the horses to New Brunswick, whence a steam tug towed them to New York.[41] The trip from Pottsville to New York could be made in seven days.

The close of the first ten years of active operation found the company enjoying such remarkable prosperity that it was announced, "Dividends will soon reach the maximum to which they are limited by law." "A new departure" was therefore to be made. The policy of the company had been

[40] Report, 1840.

[41] Report on the Improvements, 1845.

formerly a double one, to earn profits and to give facilities to traffic. "The further improvement . . will be exclusively for the latter purpose," on account of the statutory limit for profits.[42]

TOLLS AND TRAFFIC DURING THE PERIOD OF MONOPOLY.

The limitation of the company to the carrying business prevented any attempt to control the general development of the region in any way other than by furnishing good transportation facilities. The company did not therefore incur the severe public criticism meted out to the Lehigh Company during the same period. As was declared in 1844,[43] "The work is a public highway, the boats upon it belong to individuals."

The rates of toll on the general traffic were graduated agreeably to the scale fixed upon the state works, except for cotton and tobacco.[44] For these products special rates were granted to stimulate the trade with the West. On most articles a charge of three or four mills per thousand pounds per mile was made. The coal tolls were dictated by the "benefit of the trade and interest of the company." At first they were fixed at $1.68 a ton from Mount Carbon to Philadelphia, with correspondingly lower rates from intermediate points. Later they fell to $1.00, which remained the charge up to 1839, when, under the influence noted above, a rate of 90 cents was granted. At the beginning of 1842 another reduction was made to 75 cents, and later in the year to 54 cents, or ½ cent per ton mile, to meet the competition of the newly opened Reading Railroad.[45] Though this action seriously cut down the receipts, still the company could show a surplus of over 6 per cent on its capital stock in 1842 and 1843, notwithstanding that in the latter year the tonnage had begun to be cut into by the Reading Railroad.[46]

---

[42] Report, 1836.

[43] Report, 1844.

[44] Report, 1842.

[45] Reports, 1842 and 1843.

TOLLS AND TONNAGE.

During the period of its monopoly upon the traffic of the region it served, the tonnage and tolls of the canal grew in measure with the development of the surrounding country. By the end of the period there were almost 800 freight boats in active business. The first tolls are recorded in 1818, when $233 were collected. A small local traffic contributed a proportionate income up to the time when the canal was actively put into operation for the through trade in 1825. Then the first important coal shipment of 6,500 tons is recorded, yielding $9.700 in toll, and the general trade brought in $6.075.74. The following years saw both total tolls and traffic rise steadily and rapidly. From 1826 to 1828 the general traffic still formed a large part of tonnage and income, but thereafter the coal tolls became rapidly the chief resource. The coal tonnage steadily rose to the highwater mark of 584,692 tons in 1841, with a yield of tolls of $482,460, exceeded only by the coal income of 1837, $484,799, due to the higher rate then obtaining, as noted above. Meanwhile the general traffic was also growing steadily. It reached its high mark in 1839, with $123,706 income and a tonnage of 244,108. After that time it fell off sooner and more rapidly than the coal tonnage when the railroad offered its facilities. During the whole of the period of monopoly the general traffic for which the canal had been originally built formed a much larger proportion of the total than on any of the other coal carrying canals. In 1844 the statement was made that from the opening of the canal up to that time the general traffic had formed one-third of the total tonnage and had paid one-fourth of the revenue.[47]

---

[46] Reports, 1843 and 1844.

[47] The Reading Railroad, Their Policy, 1844.

No itemized tables giving the character of this general trade are given in the reports before 1826—the first year in which the traffic became important. The chief articles in the general river trade were lumber, products used in iron manufacture (lime, limestone, ore), grain and stone in the descending; and salt and plaster in the ascending traffic. Other items regularly totaling over 1,000 tons were flour, wood and whiskey. The greater proportion of the weight of the general traffic was downstream.

THE PERIOD OF COMPETITION AND COMBINATION.

The year 1842 saw the end of the monopoly of the Schuylkill Navigation upon the coal trade of the Schuylkill Valley and the opening of the period of competition with the Reading Railroad. In that year the first rail shipments are noted—49,398 tons. The next year the struggle for the coal trade began in earnest, and the Reading tonnage rose to one-half that carried by its older competitor. The managers report:[48] "The quantity of coal brought down this season is 447,058 tons, which is 9 per cent less than the trade of last year . . . caused by diverting a portion of the Schuylkill coal trade from the natural channel of the navigation and forcing it upon the railroad." To get the trade the railroad set its rates at figures before unheard of in transportation. The Schuylkill Company insisted that at such rates the railroad would ruin itself, and proudly pointed to the fact that, notwithstanding the cut in tolls, the canal had a surplus of 6 per cent on its capital stock as the result of the year's operations.[49]

The years 1843-9 saw a ruthless competition between the two companies. Each stooped to defaming the other in the public press and in pamphlets,[50] which were scattered broadcast. Some of these were even written by men who professed to be stockholders in one organization while in reality interested in the other. The public was urged to lend no money now to this one, now to that. Both, in turn, were charged with being on the verge of bankruptcy and with maintaining a ruinous competition by means of loans, which were added to the capital account and spent in granting low rates. The Reading is a "reckless association," which hopes to so discredit the canal that it may buy up its stock and curb competition. It juggles its own accounts to conceal its unprofitable operations. Of an alliance of interests no one should think. "It matters not," declares one prophetic writer, "on what terms the amalgamation be effected, the embrace is destruction for you," "but one of these works can live, the other must perish." The Schuylkill Navigation insists another is sure to go out of business and will soon be bankrupt.[51]

---

[48] Report, 1844.

[49] Report, 1844.

[50] See the Reading Railroad Company, their Policy and Prospects, etc., Examiner. Philadelphia: Sherman, 1844; also an address to the Stock-

"If we (the Reading Railroad Company) can't bring coal down *a dollar and a quarter cheaper* than the Schuylkill Navigation *we are broke*," writes an agent of the railroad, against which the canal representatives assert, "The whole of this vast trade must ultimately fall upon the canal, since the Reading Railway, being totally unable to carry coal at the present navigation prices, exists upon borrowed money alone." "The prospects ahead for the Reading are dark and gloomy as the shadows of forthcoming death. There is not in the State of Pennsylvania a professional engineer who will now affirm that the Reading . . can maintain a successful competition with the Schuylkill Navigation."[52]

---

holders of the Schuylkill Navigation Company, Anonymous, Philadelphia, 1844 (no printer), and Position and Prospects of the Schuylkill Navigation Company, Charles Ellet, Jr., Philadelphia, 1845 (no printer),

[51] An Address to the Stockholders of the Schuylkill Navigation Company, etc., Philadelphia, 1844, anonymous.

[52] The Reading Railroad Company, their Policy, and Prospects, Examiner. Philadelphia: Sherman, 1844.

Throughout these years of active competition the canal company bent every effort to outstrip the railroad in the race for traffic. No dividends were paid, and all available money was devoted to improving the waterway. New boats, a deeper channel and locks were declared to be essential.[53] To secure them, and if possible to introduce shipment by steam, a loan of $1.250,000 was authorized. To hold the trade meanwhile the Navigation Company again cut the tolls by granting a rate of 36 cents from Mount Carbon—one-third of a cent per ton per mile.[54] Even at this rate the canal met interest and expenses, but the surplus sank to $20,000. The railroad again experienced a deficit and had to add to its debt.[55]

In 1845 an extensive investigation was made as to the possibility of improving the navigation,[56] and the work of enlargement was put under way.[57] The combined railroad and canal tonnage under the influence of the low transportation rates had more than doubled from 1842 to 1845, but now the navigation company found that many of the boats were rented by those interested in the railroad and kept idle so as to decrease the transportation facilities. The Legislature was applied to for a supplement to the charter, which was granted, authorizing the company to own boats and cars directly, thus to avoid any move to cut off the means of getting traffic.

During the year 1846 the improvements which had been planned since 1842 were actively pushed and interrupted traffic during most of the season. By the end of the year the canal was on an average seventy feet in width, the depth had been increased from four to six feet and the capacity from 60 to 180 tons. It was, in fact, a navigation of an entirely new order.[58] "A great issue is now to be tried," declare the managers,[59] "for the determination of the relative merits of canals and railways in the transportation of an almost unlimited amount of heavy freight."

---

[53] An Address to the Stockholders, etc., 1844.

[54] Position and Prospects, etc., 1845.

[55] Position and Prospects, etc., 1845, and Report, 1845.

[56] Report to the Board of Managers of the Schuylkill Navigation Company on the Improvement of the Schuylkill Navigation, by S. W. Roberts. Philadelphia: Kite, 1845.

[57] Report, etc., 1846.

But the next year did not bring the success that was confidently expected. The canal did not attract boats from the other waterways, as had been hoped, the old canal-boats were largely unfit for use, and worst of all, the railroad company, by arrangements for the trade of the mining district, cut off the tonnage. The company realized more than ever that it must make itself entirely self-sufficient to be an active competitor. Accordingly, it purchased 600 coal cars and contracted for a still larger supply, as well as for a number of coal barges. It leased docks and landings at Schuylkill Haven and built others at Mount Carbon and Port Carbon.

But these improvements were too much for the financial strength of the corporation. The financial stringency of 1847 found the company exhausted, and "For the first time since the opening of our canal we find ourselves unable to meet our engagements to the bondholders and other creditors."[60] The next year retrenchment was essential. The company did not have authority to run the boats they had purchased, so they were leased to a private company. The necessity of a greater income also forced a raising of the tolls on traffic, to accomplish which the railroad and canal companies gave up their long fight and agreed to work together.[61] The charges to Philadelphia were thus set at 60 cents per ton, and to New York at $1.70, including 60 cents toll on the Raritan Canal. The barges averaged loads of 105 tons. The next year the average load rose to $109^6/_{20}$

[58] The Schuylkill Navigation Company, Philadelphia, 1852.

[59] Report, 1848.

[60] Report, 1848.

[61] Report, 1849.

tons, and the charges to 70 cents per ton to Philadelphia and $1.75 to New York.[62]

The agreement with the Reading seemed a decided benefit. The year 1850, except for heavy losses by floods, showed a decided improvement.[63] Boats were again purchased and the tonnage in 1851 was the largest in the company's history. In these years the arrears of interest noted above[64] were partly caught up, but the prosperity was in reality fictitious. The expenditures to repair the damage of the floods of July and September, 1850, coupled with ruinous rates of toll which had to be granted the following year because of a coal war on the Lehigh and Delaware and Hudson routes, brought the corporation to the verge of bankruptcy.

In this situation appeal was made to the Legislature to help them out of the difficulty. A great mass of complicated liabilities had developed through the various loans and mortgages, of which there were "twelve or fifteen different classes."[65] Authority was asked and received April 7, 1852, to change about $6,000,000 of these liabilities into stock. At the same time legal authority was received for the purchase of boats to be rented to individuals, an action which had already been taken by the company, as noticed above. These arrangements accomplished the "resuscitation of the company,"[66] but it could no longer claim to be the coal route *par excellence*. Neither in tonnage nor in capacity for handling traffic had it kept up with the improvements upon other routes, though the tonnage per boat that could be carried—180 tons—was larger than upon the other canals.

To increase the trade various improvements were now introduced. Unloading was done by steam, premiums ranging from $50 to $200 were given for the boats making the most trips per year between various points. Low toll rates were granted on lime, limestone, iron and iron ore to increase the carrying of products connected with the smelting industry. The New York trade was increased, especially that through the Raritan. The movement was so successful here that it practically put an end to the coasting trade in coal, before so important.

---

[62] Report, 1850.

[63] Report, 1851.

[64] The Schuylkill Navigation Company, Anonymous, Philadelphia, Crissy and Markley, 1852.

[65] The Schuylkill Navigation Company, p. 8.

[66] Report, 1853.

How completely the change in routes to market had been is shown by the following table for 1853:[67]

Delivered:—

Between Port Carbon and Philadelphia	155,750
Philadelphia	151,040
New York by the Raritan Canal	474,105
Coastwise from the Schuylkill	85,000
On Delaware River and Bay	22,800
Tons	888,695

These years of co-operation with the Reading were again bringing the company into a prosperous condition. By 1855 it was able again to pay dividends to the old stockholders, who for thirteen years had received no return from their properties. The benefits reaped by combination with the Reading may be seen by a comparison of the results of operation for 1841, the year of greatest tonnage previous to enlargement; 1845, a year typical of the period of competition and preceding the enlargement, and 1856, a prosperous year under combination and subsequent to the enlargement.

	1841	1845	1856
Total tonnage	737,517	467,742	1,440,011
Anthracite, tons	584,692	263,567	1,169,453
Miscellaneous, tons	152,825	204,155	279,558
Total tolls	$557,689	$135,147	$800,498

---

[67] Report, 1854.

The tonnage of 1856 trebled that of 1845, but the tolls in the year typical of co-operation were six times as great as the year typical of the competitive period. The results in these years seemed to prove the assertion of the managers made in 1859, that the canal had proved itself amply able to compete with the railroads for the coal trade.[68]

The Civil War affected the Schuylkill Navigation differently from other coal carrying canals. Tonnage did not rise as it did on other routes. It fell in 1861 and 1862, due to the general business depression and to the purchase of many of the barges by the government in the latter year. In 1863 "the rebel raid into the state in the month of June" caused such a scare that everybody stopped the coal trade for one month, and conditions throughout the year continued unsatisfactory. In January, 1863, negotiations were undertaken with the Reading Railroad and the Mine Hill and Schuylkill Haven Railroad Company to effect "a more perfect union and harmony of action between said companies for the protection and development of the coal trade of Schuylkill County and securing its transportation to the great markets of consumption."[69] The negotiations resulted in the transference of the control of the Mine Hill and Schuylkill Valley Railroad Company to the Reading Railroad and the canceling of contracts with the former company then held by the Schuylkill Navigation Company. These preliminaries being settled, the Reading and the Schuylkill Navigation agreed further, as follows:

The Reading granted to the Schuylkill Navigation the same rates on all lateral coal roads in its control as were charged the operating company itself. If deficit resulted in the operation of any of such roads the expense was to be shared in the proportion of the respective tonnages carried on such roads by the companies. Equal charges were to be made by both companies for transportation, whether to way stations or to tide. If either company decided to grant any drawbacks on coal shipped to the tidewater of the Delaware or Schuylkill, it must first inform the other of such intended action. Finally, the coal tonnage was to be divided, 45 per cent going to the canal and 55 per cent to the railroad—the approximate proportion in which coal was carried during the yearly period of active operation of the canal. If either party carried more than its share it should pay the other 25 cents per ton on such excess, except on coal carried during a suspension on the canal, between April 1st and December 15th, and in years when the canal might carry over 1,750,000 tons.

---

[68] Report, 1859.

[69] Report, 1864.

This agreement went into force May 1, 1863,[70] and placed "the coal trade of the two companies . . in the position which for many years it should have occupied."[71] Through this agreement, by high charges, large profits were gained in the last three years of the war, though the tonnage was but moderate. The arrangement was not satisfactory, however, to either of the companies. The Reading did not relish paying the canal company because its own traffic had increased beyond a certain proportion of the total, and the agreement as to payment for service on the lateral roads was as little liked by the canal company.[72] A new arrangement was made by which for "five years from January 1, 1865," the Schuylkill Company was to pay a fixed rate per ton on the lateral roads rather than bear its proportional share of their maintenance expenses.[73] But even this did not bring satisfactory conditions. The sharp competition and depressed market of the years 1867-9 showed the "necessity of a further arrangement with the Reading Company."[74]

---

[70] The final agreement was not completed until May 12, 1864, Report, 1865.

[71] Report, 1864.

[72] Reports, 1865 and 1867.

[73] Report, 1867.

[74] Report, 1869.

The next step in the history of the canal is the completion of this closer alliance by the amalgamation of the two interests. In the report of the Reading Railroad for 1871 we read, "Upon the 12th of July last (1870) after (a) negotiation of many months the company entered into a lease and contract with the Schuylkill Navigation Company and took possession of the works and property of the latter company, thus terminating in a friendly spirit . . a rivalry that had existed so many years." The company which had predicted that the attempt of the Reading to compete for the coal trade would mean the railroad's ruin had been absorbed by its competitor. After competition had yielded to co-operation, co-operation yielded to merger.

TONNAGE AND TOLLS DURING THE PERIOD OF COMPETITION AND COMBINATION.

The total tonnage during the period 1842-1867 rose and fell with the varying fortunes of the company and the coal trade, as indicated above. The period of competition saw a steady decrease from the 737,517 tons in 1841 to 432,397 in 1847 (1846 is not considered, as the improvements in process explain the low tonnage in that year). Then came a period of steady rise in traffic, broken only by 1850, the year of heavy floods. With this exception each year from 1848-1859 exceeded the tonnage of the preceding, the totals rising from 679,574 to 1,699,101, practically an increase of a million tons. This was the highwater mark. During the Civil War and up to the time of the lease by the Reading the tonnage remained fairly stationary, at about one and one-quarter million tons. The coal tonnage during the period follows about the same waves as the total tonnage.

The toll receipts indicate even more clearly than the tonnage the varying fortunes of the corporation. At the height of the competitive period the total coal receipts fell to $79,800—about one-sixth what they had been four years before, when the tonnage was less than twice as great. With the year 1849 the toll receipts cease to be determined by competition, but under the agreement with the Reading approached more nearly the standard of what the traffic would bear. This explains the apparent lack of relation between toll receipts and tonnage in the years 1848-1868.[75]

The toll receipts on articles other than coal fall with the advent of the railroad, they experience a slow increase again with the gradual growth of trade in the heavier articles of the general traffic. But they never throughout the period again reach either the relative or absolute importance they held during the time when the canal was the pre-eminent transportation route for heavy freight in the Schuylkill region. The highwater mark of 1839 ($123,706) was approached only just before the Civil War and just before the lease.

The character of the general trade remained much the same as in the earlier period. The chief gains were in those products connected with iron manufacture. Lime shipments rose steadily, reaching about 75,000 tons in the six years before the Civil War and falling to about 33,000 tons in an equal period preceding the lease. Limestone shipments went through the same development, the tonnage being about two-thirds as much as that of lime. Iron shipments reached about 75,000 tons in the middle fifties. Other articles which continued to be shipped in smaller and less regular amounts were lumber, grain, flour, stone, iron ore, plaster and marble. (For details see tables elsewhere.)

Operation Under the Lease.

By the terms of the lease to the Reading Railroad Company the entire property of the Schuylkill Navigation Company passed into its control for 999 years from January 1, 1870. A yearly rental of $655,000 was guaranteed, which was to be reduced as certain obligations of the canal company were liquidated by the Reading. The lessee was obligated to "keep and maintain the said canal and navigation works . . in as good order and condition as the same now are," except the north part, known as the Hamburg Canal. The Reading accepted this responsibility, but almost from the first showed that it considered this stipulation as the maximum of their obligations to the waterway, and that their general policy would be as far as possible to divert its tonnage to the railroad, as the way to secure the greatest profit.

---

[75] See General Table.

In the first full year of operation the Reading established a transportation line upon the canal,[76] which it maintained until 1888. This is the first time the company owning the property becomes also a carrier upon it, as the old company did not have authority to operate transportation facilities directly. The venture did not prove a success, for though the company carried about one-half of the coal tonnage of the canal, the result of operations was generally a small loss. In 1873 the Reading company report their belief that if they had taken all the canal tonnage on the railroad the results of operation would have shown a greater profit than was earned, but they concluded that it was better "not to sacrifice the future for the present gain," for "it cannot be long before the railroad will be so crowded with business that the value of such an outlet (as the canal) will be apparent."[77] Again, in 1874,[78] they argue that shipments of from 900,000 to 1,000,000 tons are necessary to operate the canal at a profit, but though they could throw this tonnage to the canal, "it is manifestly to the interest of the company to keep as much tonnage upon the railroad as possible and use the canal as a dripping pan to catch whatever may overflow from the railroad, which will doubtless soon be enough

[76] Reading Report, 1872.
[77] Reading Report, 1873.
[78] Reading Report, 1874.

to make the canal profitable *per se*." Meanwhile the Reading was willing to accept gracefully the annual loss on canal operation due to the freedom from competition obtained by the lease and to the fact that the loss was a less sum than would have had to be paid to the canal company under the former contracts.

The losses on the canal were due to a number of causes. The policy of sending the coal by the railroad whenever possible reduced traffic. When curtailments of shipments through strikes came, the canal was the more seriously affected. In addition, beginning with 1880, improved railroad connections brought a decrease in the through canal-boat traffic to New York, as is indicated in the following table:[79]

CHARACTER OF THE COAL TRADE ON THE SCHUYLKILL NAVIGATION.

	Local, Philadelphia and Vicinity (tons)	Local, Delivered along the line (tons)	Competitive to the Raritan Canal (tons)
1879	315,610.12	108,282.05	486,835.10
1880	245,892.10	105,696.06	173,410.00
1881	250,888.10	112,466.10	237,092.00

In 1887, under the receivership then in control of the Reading system, a new arrangement with the canal interests was put through, by which the rent for the navigation was lowered from $634,894.06 to $374,582.13. The policy of the railroad in managing the coal tonnage on the canal in such a way as to give the railroad all but a minimum, the shipping of which would bring the company the least loss from canal operation, is indicated by the fact that immediately upon this fall in fixed charges the tonnage experiences a corresponding reduction.[80]

---

[79] Reading Reports.

[80] Report of the President and Managers to the Stockholders of the Reading and Report of the Receivers for the year ending November 30, 1887.

The following year a further reduction in canal rent was made, the charge being reduced to $49,022.65.[81] The charge since then has been successively reduced and is entered in 1896 as $9,236.18.[82]

SUMMARY OF EARNINGS, LOSSES AND TONNAGE UNDER READING MANAGEMENT.

The fact that the railroad found it more to its interest to develop its rail traffic as rapidly as possible explains the course of the earnings on the canal under the lease. Through extensive improvements and additions to trackage and rolling stock the railroad was able to carry an ever increasing tonnage, and the time never came when the overflow of trade from the railroad contributed to sustaining the canal. The "dripping pan" policy did not succeed because the management, as time went on, decided it was more profitable to add new railroad facilities than to rehabilitate the canal. For this reason the tonnage, especially in the coal trade on the canal, steadily decreased; especially is this true after 1887, when the transportation line owned and operated by the company was abolished.[83] The coal traffic then sank from the 571,413 tons to which it had declined to 194,313 tons. The decrease is steady also in the general merchandise traffic carried principally by independent boats.[84]

Earnings follow the same general course as the tonnage figures. From $1,077,079.12 received in 1871 they drop to $661,540.41 the following year, after which, with some fluctuations, they remain at somewhat over half a million till 1883; then the decline is steady and rapid until in 1896, the last year reported, the entry is $53,404.45. Expenses show a decline in the operation items less in proportion than the decrease in traffic. The chief item, however, is fixed charges, which remain practically stationary till the changes of 1887 and 1888, noted above. This item is the one which chiefly contributes to the loss on the canal experienced in every year except the first, in which the canal was under the operation of the railroad.

---

[81] Reading Report, 1889 (for 1888).

[82] The reports of canal operations under Reading management are very brief, and in the later eighties become mere entries in the expense accounts. After 1896 even these items disappear without any explanation being made.

[83] It ran in 1888, but carried a very small tonnage.

[84] After 1889 all statistics of tonnage disappear from the Reading Reports.

TONNAGE OF TRAFFIC ON THE SCHUYLKILL NAVIGATION.

Only articles over 1,000 tons noted—[1] represents ascending tonnage [2] descending tonnage.

	1826	1827	1828	1829	1830	1831
Coal	16,767[2]	31,360[2]	47,284[2]	79,973[2]	89,984[2]	81,854[2]
Limestone	....	3,521[2]	5,358[2]	8,968[2]	15,511[2]	29,319[2]
	....	1,697[1]	2,701[1]	....	9,742[1]	8,306[1]
Lumber	1,492[2]	2,006[2]	6,795[2]	5,091[2]	4,871[2]	9,470[2]
	....	1,176[1]	....	....	5,693[1]	9,972[1]
Grain	....	....	2,644[2]	3,139[2]	4,256[2]	6,251[2]
Flour	2,023[2]	2,994[2]	6,365[2]	5,023[2]	7,799[2]	10,248[2]
Iron	....	1,533[2]	1,853[2]	....	1,125[2]	1,649[2]
Wood	....	1,297[2]	1,445[2]	....	....	....
Stone	1,207[2]	6,078[2]	6,791[2]	3,615[2]	7,080[2]	7,000[2]
	....	....	....	....	....	2,107[1]
Iron Ore	2,541[2]	....	1,847[2]	....	....	1,384[2]
	....	....	2,267[1]	....	....	....
Plaster	....	2,182[1]	6,308[1]	3,320[1]	6,681[1]	2,345[1]
Salt	....	....	....	2,288[1]	2,852[1]	2,155[1]
Whiskey	....	....	1,152[2]	....	1,146[2]	1,839[2]
Blooms and Castings	....	....	1,424[2]	....	1,137[2]	2,569[2]
Nails	....	....	1,098[2]	....	1,406[2]	1,666[2]
Bricks	....	....	....	....	3,234[1]	....
And others	....	....	....	....	....	....
Total	25,561[2]	53,782[2]	84,133[2]	112,704[2]	136,531[2]	1[illegible]5,622[2]
	6,843[1]	11,719[1]	21,329[1]	21,800[1]	44,094[1]	40,791[1]

TONNAGE OF TRAFFIC ON THE SCHUYLKILL NAVIGATION.

Only articles over 1,000 tons listed. [1] Represents ascending tonnage, [2] descending tonnage.

	1832	1833	1834	1835	1836	1837	1838	1839
Coal	209,271[2]	252,971[2]	226,692[2]	339,508[2]	432,045[2]	523,152[2]	433,875[2]	442,608[2]
Lime	....	....	....	15,194[2]	18,629[2]	21,754[2]	24,439[2]	31,695[2]
	....	....	....	....	....	....	1,639[1]	....
Limestone[3].	37,627[2]	53,219[2]	56,102[2]	52,225[2]	44,920[2]	50,367[2]	49,252[2]	53,975[2]
	9,309[1]	12,275[1]	5,702[1]	....	2,707[1]	3,757[1]	2,125[1]	5,158[1]
Lumber ...	8,710[2]	13,470[2]	14,803[2]	14,727[2]	12,153[2]	9,672[2]	12,337[2]	11,640[2]
	....	2,532[1]	3,488[1]	2,820[1]	1,845[1]	3,394[1]	2,790[1]	3,927[1]
Grain	4,825[2]	9,337[2]	10,734[2]	15,925[2]	16,267[2]	11,572[2]	19,278[2]	19,113[2]
	1,500[1]	1,339[1]	....	....	1,128[1]	4,413[1]	2,183[1]	1,801[1]
Flour	7,349[2]	12,107[2]	10,255[2]	12,329[2]	9,403[2]	5,669[2]	7,792[2]	9,971[2]
	....	....	....	....	....	1,078[1]	....	....
Iron	1,960[2]	2,046[2]	1,955[2]	2,342[2]	4,667[2]	5,823[2]	9,075[1]	16,623[2]
	....	2,886[1]	1,829[1]	1,376[1]	3,040[1]	4,318[1]	4,441[1]	2,165[1]
Wood	....	1,790[2]	1,101[2]	....	2,039[2]	3,272[2]	2,389[2]	5,560[2]
Stone	2,343[2]	2,383[2]	1,767[2]	1,621[2]	3,223[2]	4,668[2]	3,410[2]	1,757
	....	....	....	....	2,062[1]	1,629[1]	....	....
Shingles....	....	....	....	....	....	1,272[2]	....	2,159[2]
Iron Ore ...	1,691[2]	2,252[2]	1,563[2]	2,446[2]	1,851[2]	1,873[2]	2,403[2]	3,140[2]
	....	11,705[1]	3,002[1]	2,960[1]	2,280[2]	2,610[1]	1,437[1]	2,654[1]
Plaster	8,671[1]	26,494[1]	10,070[1]	11,759[1]	10,518[1]	16,730[1]	10,732[1]	13,147[1]
Salt	3,875[1]	3,434[1]	3,472[1]	3,680[1]	3,402[1]	4,306[1]	4,858[1]	4,452[1]
Whiskey ..	1,949[2]	1,759[2]	1,953[2]	1,715[2]	1,971[2]	1,379[2]	1,764[2]	1,010[2]
Blooms and	3,611[2]	4,607[2]	5,844[2]	8,785[2]	6,726[2]	2,800[2]	1,585[2]	2,901[2]
Castings	1,396[1]	....	....	....	....	....	....	....
Nails	1,232[2]	1,595[2]	1,445[2]	2,407[2]	2,050[2]	1,775[2]	3,087[2]	3,206[2]
Bricks	....	....	....	....	....	1,956[1]	1,045[1]	....
And Others.	....	....	....	....	....	....	....	....
Total	282,561[2]	359,898[2]	338,564[2]	477,743[2]	570,094[2]	656,913[2]	580,521[2]	621,524[2]
	38,107[1]	84,197[1]	55,821[1]	57,451[1]	61,079[1]	69,817[1]	63,112[1]	65,192[1]

[3] Includes lime in 1832-4.

TONNAGE OF TRAFFIC ON THE SCHUYLKILL NAVIGATION.

Only articles over 1,000 tons listed.—[1] Represents ascending tonnage, [2] descending tonnage.

	1840	1841	1842	1843
Coal.	452,291[2]	584,692[2]	491,602[2]	447,058[2]
Lime	41,741[2]	26,989[2]	39,269[2]	29,640[2]
	....	....	1,184[1]	1,024[1]
Limestone. ..	35,674[2]	28,359[2]	33,214[2]	27,515[2]
	3,279[1]	3,164[1]	3,895[1]	3,306[1]
Lumber.	8,551[2]	8,000[2]	11,180[2]	10,870[2]
	3,292[1]	3,833[1]	3,354[1]	5,655[1]
Grain.	28,049[2]	13,997[2]	6,376[2]	10,613[2]
	1,799[2]	2,387[1]	3,314[1]	4,231[1]
Flour.	10,933[2]	5,093[2]	4,177[2]	6,333[2]
Iron.	6,600[2]	5,016[2]	2,927[2]	5,394[2]
	1,508[1]	3,521[1]	... .	1,489[1]
Wood.	6,388[2]	7,388[2]	5,073[2]	3,148[2]
	....	....	....	1,355[1]
Stone.	1,412[2]	4,038[2]	2,231[2]	3,116[2]
Shingles.	1,524[2]	1,263[2]	2,502[2]	2,131[2]
Sand.	....	....	1,139[2]	1,517[2]
Iron Ore......	2,120[2]	3,556[2]	2,576[2]	1,181[2]
	1,996[1]			
Plaster.	10,833[1]	6,241[1]	5,930[1]	5,791[1]
Salt..........	3,744[1]	2,621[1]	2,116[1]	2,877[1]
Rails.........	1,105[1]	1,337[1]	1,245[1]	1,101[1]
Blooms and Castings....	2,440[2]	1,922[2]	. ...	....
And Others ..	....	....	....	....
Total.	609,860[2]	698,627[2]	610.477[2]	556,638[2]
	48,684[1]	38,890[1]	33,221[1]	36,768[1]

TONNAGE OF TRAFFIC ON THE SCHUYLKILL NAVIGATION.

Only articles over 1,000 tons listed. [1]Represents ascending tonnage, [2] descending tonnage.

	1844	1845	1846	1847	1848	1849	1850	1851	1852	1853
Coal	398,887[2]	263,587[2]	?	222,693[2]	436,602[2]	489,208[2]	288,030[2]	579,156[2]	800,038[2]	888,695[2]
Lime	....	47,551[2]	22,161[2]	50,844[2]	60,610[2]	66,454[2]	47,490[2]	64,618[2]	58,364[2]	60,570[2]
	41,424[2]	....	....	1,662[1]	1,859[1]	2,911[1]	2,276[1]	5,329[1]	3,813[1]	4,137[1]
Limestone.	34,377[2]	37,445[2]	19,948[2]	29,943[2]	37,624[2]	34,594[2]	32,702[2]	43,891[2]	43,754[2]	50,273[2]
	3,660[1]	3,342[1]	....	15,910[1]	11,979[1]	6,092[1]	6,906[1]	7,693[1]	4,989[1]	9,836[1]
Lumber .	12,652[2]	13,560[2]	2,944[2]	14,246[2]	11,275[2]	6,675[2]	8,471[2]	....	8,070[2]	7,550[2]
	7,040[1]	6,681[1]	11,361[1]	12,654[1]	11,108[1]	11,316[1]	9,537[1]	18,088[1]	15,768[1]	22,783[1]
Grain	7,540[2]	8,742[2]	4,894[2]	5,221[2]	5,515[2]	5,193[2]	2,877[2]	7,200[2]	5,662[2]	4,466[2]
	5,872[1]	6,648[1]	4,031[1]	7,083[1]	7,841[2]	7,044[1]	4,844[1]	8,420[1]	9,868[1]	7,321[1]
Flour	7,315[2]	7,016[2]	4,173[2]	6,240[2]	4,705[2]	5,514[2]	4,067[2]	5,390[2]	5,322[2]	3,811[2]
	....	1,167[1]	....	....	....	1,163[1]	....	1,016[1]	....	....
Iron	6,555[2]	8,610[2]	3,756[2] 1,075[2]	7,127[2] 3,769[2]	13,038[2] 4,564[2]	8,731[2] 3,555[2]	7,336[2] 3,046[2]	18,854[2] 6,881[2]	6,062[1] 3,193[1]	15,552[2] 8,883[2]
	2,710[1]	2,642[1]	1,455[1]	2,503[1] 1,181[1]	3,531[1] 3,954[1]	1,657[1]	2,872[1]	4,259[1] 4,004[1]	17,820[2] 6,203[2]	11,106[1] 4,524[1]
Wood	4,418[2]	4,450[2]	1,902[2]	2,351[2]	2,719[2]	2,071[2]	1,558[2]	1,901[2]	2,475[2]	3,237[2]
	....	....	....	....	....	1,004[1]	....	....	1,428[1]	1,352[1]
Nails	2,932[2]	2,843[2]	....	....	....	1,153[2]	....	1,053[2]	....	....
Stone	2,851[2]	2,385[2]	....	....	....	1,032[2]	1,201[2]	2,976[2]	1,595[2]	....
	....	1,968[1]	1,255[1]	1,701[1]	....	3,381[1]	2,100[1]	9,438[1]	10,743[1]	10,462[1]
Iron Ore ..	2,355[2]	6,916[2]	5,276[2]	1,768[2]	2,730[2]	5,296[2]	3,573[2]	7,993[2]	17,548[2]	27,715[2]
	....	1,792[1]	....	13,116[1]	13,841[1]	5,139[1]	1,388[1]	5,277[1]	7,326[1]	15,730[1]
Sand	2,133[2]	4,928[2]	....	1,493[2]	4,583[2]	3,719[2]	1,864[2]	2,335[2]	2,288[2]	4,962[2]
	....	....	....	3,139[1]	2,056[1]	3,585[1]	2,492[1]	4,982[1]	4,088[1]	6,714[1]
Shingles ..	1,968[2]	2,112[2]	....	1,411[2]	2,043[2]	1,456[2]	1,681[2]	....	....	....
Plaster ...	5,929[1]	6,236[1]	4,291[1]	1,969[1]	4,571[1]	3,827[1]	1,873[1]	3,251[2]	....	2,538[1]
Bricks ...	....	1,659[1]	....	1,829[1]	....	1,132[1]	....	1,136[1]	....	4,061[1]
Soapstone	....	....	....	1,061[1]	1,811[2]	....	1,337[2]	2,123[2]	1,441[2]	2,613[2] 1,236[1]
Salt	2,447[1]	2,505[1]	1,081[1]	1,032[1]	....	1,046[1]	....	2,447[1]	2,054[1]	1,596[1]
Marble....	....	2,283[2]	2,550[2]	1,496[2]	1,092[2]	1,392[2]	1,483[2]	1,557[2]	2,395[2]	....
							1,281[1]	....	....	1,648[2]
Blooms and Castings.	....	1,159[2]	....	1,491[2]	2,034[2]	2,837[2]	1,879[2]	3,681[2]	5,625[2]	6,818[2]
And Others	....	....	....	....	....	....	....	....	....	....
Total	532,190[2]	420,079[2]	[3]76,438[2]	355,160[2]	598,488[2]	645,996[2]	413,647[2]	754,555[2]	987,427[2]	1,093,585[2]
	41,281[1]	47,663[1]	32,350[1]	77,237[1]	81,086[1]	65,539[1]	44,375[1]	87,542[1]	87,272[1]	122,405[1]

[3] Coal omitted

TONNAGE OF TRAFFIC ON THE SCHUYLKILL NAVIGATION.

Only articles over 1,000 tons listed. [1] Represents ascending tonnage, [2] descending tonnage.

	1854	1855	1856	1857	1858	1859	1860	1861
Coal	907,354[2]	1,105,263[2]	1,169,453[2]	1,275,988[2]	1,323,804[2]	1,372,109[2]	1,356,678[2]	1,183,570[2]
Lime	55,084[2]	74,385[2]	62,499[2]	71,498[2]	70,017[2]	72,310[2]	73,335[2]	4,859[2]
	2,712[1]	4,413[1]	3,549[1]	4,291[1]	4,859[1]	4,950[1]	3,838[1]	3,251[1]
Limestone	39,447[2]	25,687[2]	23,122[2]	27,486[2]	26,132[2]	29,827[2]	27,729[2]	21,470[2]
	13,837[1]	17,278[1]	16,365[1]	23,188[1]	29,167[1]	32,856[1]	28,565[1]	12,304[1]
Lumber	7,358[2]	2,795[2]	....	6,879[2]	27,492[2]	26,347[2]	14,813[2]	13,541[2]
	17,592[1]	25,925[1]	22,620[1]	10,469[1]	6,377[1]	6,903[1]	8,556[1]	4,575[1]
Grain	1,699[2]	....	....	7,120[2]	9,926[2]	10,796[2]	9,275[2]	15,607[2]
	8,844[1]	5,162[1]	5,389[1]	2,810[1]	5,077[1]	3,320[1]	1,335[1]	1,093[1]
Flour	1,527[2]	....	....	2,292[2]	3,755[2]	1,718[2]	2,236[2]	1,724[2]
Iron	21,853[2] 8,572[2]	25,550[2] 12,791[2]	29,601[1] 13,045[2]	35,704[2] 14,833[2]	20,567[2] 14,487[2]	29,855[2] 19,734[2]	34,722[2] 11,085[2]	22,077[2] 6,020[2]
	14,626[1] 5,433[1]	11,362[1] 4,358[1]	19,261[1] 4,643[1]	13,880[1] 5,399[1]	7,063[1] 4,414[1]	8,320[1] 5,939[1]	7,467[1] 6,493[1]	3,010[1] 2,387[1]
Wood	1,608[2]	2,049[2]	1,673[2]	1,313[2]	1,004[2]	....	1,192[2]	....
	1,506[1]	2,132[1]	2,170[1]	1,371[1]	1,359[1]	....	....	....
Nails	....	....	1,353[2]	1,369[2]	1,732[2]	1,560[2]	1,383[2]	....
Stone	....	....	1,025[2]	....	....	....	3,022[1]	....
	10,730[1]	8,205[1]	5,662[1]	3,078[1]	1,501[1]	1,554[1]	....	....
Iron Ore	13,223[2]	7,954[2]	8,360[2]	21,937[2]	10,213[2]	9,867[2]	2,548[2]	3,831[2]
	28,352[1]	11,831[1]	9,525[1]	10,044[1]	4,703[1]	4,956[1]	11,401[1]	2,304[1]
Sand	3,870[2]	2,185[2]	1,321[2]	2,053[2]	....	1,849[2]	1,436[2]	1,062[2]
	5,230[1]	3,606[1]	2,914[1]	4,963[1]	3,180[1]	3,479[1]	4,439[1]	2,746[1]
Shingles	....	....	....	....	....	1,122[2]	....	....
Plaster	2,564$_1$	2,283[1]	1,335[1]	2,250[1]	3,345[1]	3,462[1]	2,713[1]	3,375[1]
Bricks	2,091[1]	3,762[1]	3,735[1]	1,318[1]	1,626[1]	2,195[1]	1,880[1]	1,410[1]
Soapstone	1,794[2]	2,974[2]	3,385[2]	2,380[2]	2,182[2]	2,615[2]	2,093[2]	1,322[2]
	1,381[1]	....	1,132[1]	1,188[1]	....	1,392[1]	1,593[1]	....
Salt	1,669[1]	2,088[1]	1,971[1]	1,823[1]	3,754[1]	2,719[1]	2,761[1]	3,774[1]
Marble	1,236[2]	....	....	....	....	....	....	....
Blooms and Castings	4,504[2]	3,192[2]	4,829[2]	6,529[2]	7,031[2]	7,065[2]	4,591[2]	4,703[2]
And Others	....	....	....	....	....	....	....	....
Total	1,075,988[2]	1,273,376[2]	1,324,811[2]	1,489,775[2]	1,530,378[2]	1,598,653[2]	1,551,767[2]	1,330,204[2]
	142,510[1]	123,117[1]	124,200[1]	105,753[1]	92,292[1]	100,448[1]	99,649[1]	55,173[1]

TONNAGE OF TRAFFIC ON THE SCHUYLKILL NAVIGATION.

Only articles over 1,000 tons listed.—[1] Represents ascending tonnage, [2] descending tonnage.

	1862	1863	1864	1865	1866	1867	1868	1869
Coal	981,728[2]	885,542[2]	1,005,839[2]	1,022,740[2]	1,297,047[2]	1,030,235[2]	987,627[2]	Entries cease.
Lime	44,570[2]	39,410[2]	27,665[2]	31,282[2]	32,596[2]	33,146[2]	30,637[2]	
	2,785[1]	2,257[1]	....	2,237[1]	3,427[1]	....	4,550[1]	
Limestone	9,467[2]	22,025[2]	18,508[2]	12,425[2]	25,047[2]	21,185[2]	24,556[2]	
	19,167[1]	13,422[1]	11,939[1]	10,577[1]	13,215[1]	17,758[1]	18,483[1]	
Lumber ..	13,319[2]	23,918[2]	29,550[2]	11,032[2]	26,969[2]	38,058[2]	24,523[2]	
	5,076[1]	5,739[1]	4,900[1]	4,310[1]	3,734[1]	4,193[1]	5,131[1]	
Grain	11,225[2]	7,042[2]	5,725[2]	3,014[2]	1,342[2]	2,755[2]	1,213[2]	
	1,124[1]	6,142[1]	6,141[1]	9,520[1]	....	4,319[1]	4,104[1]	
Flour	....	1,115[2]	1,118[2]	....	....	....	....	
	....	....	....	....	14,183[1]	....	....	
Iron	9,955[2] 24,853[2]	4,325[2] 24,117[2]	2,702[2] 14,130[2]	5,403[2] 12,794[2]	3,311[2] 17,518[2]	4,184[2] 15,392[2]	6,287[2] 20,529[2]	
	5,418[1] 5,053[1]	4,270[1] 4,379[1]	3,306[1] 5,283[1]	3,496[1] 3,646[1]	2,847[1] 3,918[1]	3,525[1] 1,469[1]	5,293[1] 3,575[1]	
Wood	....	....	....	1,088[2]	1,320[2]	1,476[2]	1,456[2]	
	....	....	1,305[1]	5,167[1]	6,713[1]	5,091[1]	5,689[1]	
Nails	1,292[2]	1,150[2]	....	....	....	....	1,310[2]	
Stone	....	1,989[2]	3,113[2]	3,242[1]	3,473[2]	4,568[2]	1,900[2]	
	....	....	....	....	6,461[1]	4,469[1]	2,770[1]	
Iron Ore ..	4,493[2]	5,636[2]	3,617[2]	2,840[2]	4,500[2]	4,127[2]	3,183[2]	
	9,421[1]	6,503[1]	13,397[1]	12,133[1]	53,381[1]	47,237[1]	59,914[1]	
Sand	1,314[2]	....	2,126[2]	1,821[2]	2,054[2]	3,564[2]	2,912[2]	
	4,406[1]	3,699[1]	4,831[1]	7,288[1]	7,525[1]	8,941[1]	7,434[1]	
Shingles ..	1,278[2]	....	....	....	....	....	....	
Plaster ...	....	....	....	....	....	....	1,902[1]	
	1,764[1]	1,726[1]	3,894[1]	2,104[1]	2,259[1]	3,238[1]	....	
Clay	....	....	6,636[1]	6,022[1]	....	9,713[1]	9,598[1]	
Bricks ...	1,237[1]	....	1,906[1]	....	1,944[1]	1,855[1]	3,998[1]	
Cinders ...	....	....	3,569[2] 10,513[1]	....	....	1,725[1]	2,362[1]	
Soapstone	1,174[1]	....	1,680[2]	1,733[2]	1,838[2] 1,031[1]	2,125[2]	2,443[2]	
Salt	2,740[1]	2,010[1]	2,182[1]	1,392[1]	....	1,240[1]	....	
Bark	....	....	1,444[2]	1,430[2]	1,839[2]	1,025[2]	....	
Blooms and	2,340[2]	1,022[2]	....	....	2,782[2]	5,582[2]	2,380[2]	
Castings.	....	....	....	....	7,348[1]	....	2,317[1]	
And Others	....	....	....	....	....	....	....	
Totals	1,114,626[2]	1,029,411[2]	1,135,027[2]	1,117,786[2]	1,434,630[2]	1,176,109[2]	1,117,892[1]	
	75,567[1]	75,524[1]	89,545[1]	82,886[1]	145,091[1]	131,419[1]	149,528[1]	

TONNAGE OF TRAFFIC ON SCHUYLKILL NAVIGATION UNDER READING RAILROAD MANAGEMENT.

Year	Schuylkill Canal, Merchandise Tonnage	Schuylkill Canal, Coal Tonnage	Schuylkill Canal, Transportation Line, Merchandise Tonnage	Schuylkill Canal, Transportation Line, Coal Tonnage.
1877	114,940.00	814,036.00	12,763.07	425,993.00
1878	84,200.00	689,718.00	12,580.19	383,973.00
1879	81,189.00	910,917.05	16,393,00	510,637.00
1880	105,427.13	524,988.16	54,875.08	325,870.00
1881	110,647.00	600,447.00	90,144.11	358,289.10
1882	120,767.00	524,097.12	19,058.02	333,461.10
1883	104,074.18	566,439.10	5,826.18	417,778,00
1884	95,107.01	498,030.19	5,439.14	360,920.00
1885	78,813.00	539,954.05	1,197.17	381,268.10
1886	65,925.00	571,413.00	522.09	381,688.00
1887	59,354.00	194,313 00	2,956.16	403,214.18
1888	62.159.00	208,053.00	(Entries cease)	....
1889	47,849.00	153,436.00	....	....

There are no entries of tonnage before 1877, and none after 1889.

GENERAL STATEMENT OF THE BUSINESS OF THE SCHUYLKILL NAVIGATION COMPANY.—I.

Year.	Total Tonnage.	Tonnage on Coal.	Toll on Coal.	Toll on other Articles.	Total Toll	Amount on Rents.
1818	....	....	....	....	$233.00	....
1819	....	....	....	....	1,202.16	....
1820	....	....	....	....	803.07	....
1821	....	....	....	....	1,792.60	....
1822	....	....	....	....	1,054.97	....
1823	....	....	....	....	1,964.38	....
1824	....	....	....	....	635.00	....
1825	....	6,500	$9,700.00	$6,075.74	15,775.74	$4,700.00
1826	32,404	16,767	25,147.00	17,961.87	43,108.87	4,900.00
1827	65,501	31,630	33,317.00	24,832.74	58,149.74	6,976.00
1828	105,463	47,284	46,202.00	40,969.56	87,171.56	7,618.00
1829	134,524	79,973	77,032.00	43,007.00	120,039.00	10,574.00
1830	180,755	89,984	87,192.00	60,973.95	148,165.95	13,800.00
1831	196,413	81,854	78,781.00	55,224.32	134,005.92	13,750.00
1832	327,921	209,271	199,784.00	65,045.70	264,829.70	15,207.00
1833	445,849	252,971	228,138.00	97,348.00	325,486.63	16,673.00
1834	395,720	226,692	204,490.14	95,350.91	299,841.05	16,687.67
1835	535,194	339,508	310,475.19	123,168.45	433,643.64	17,898.54
1836	631,173	432,045	399,472.59	123,160.67	522,633.26	16,328.85
1837	726,730	523,152	484,799.29	119,390.28	604,189.57	13,754.16
1838	643,633	433,875	385,024.48	120,226.56	505,351.04	19,371.81
1839	686,716	442,608	381,198.01	123,706.11	504,904.12	16,957.33
1840	658,544	452,291	373,400.50	94,979.58	468,380.08	11,746.23
1841	737,517	584,692	482,460.62	75,228.77	557,689.39	18,178.41
1842	643,698	491,602	235,544.01	59,897.03	295,441.04	19,652.60
1843	593,406	447,058	214,451.97	46,272.41	260,724.38	19,070.25
1844	573,471	398,887	123,259.81	46,620.44	169,880.25	20,813.06
1845	467,742	263,587	79,800.81	55,346.38	135,147.19	17,336.98
1846	108,788	3,437	1,757.22	34,122.26	35,879.48	18,732.91
1847	432,397	222.693	122,405.81	86,666.77	209,072.58	12,640.24

GENERAL STATEMENT OF THE BUSINESS OF THE SCHUYLKILL NAVIGATION COMPANY.—II.

Year.	Total Tonnage.	Tonnage Coal.	Toll on Coal.	Toll on other Articles.	Total Toll.	Amount on Rents.
1848	679,574	436,602	$178,479.98	$76,891.44	$255,471.42	$23,394.28
1849	711,525	489,208	331,965.52	79,879.97	411,845.49	27,178.97
1850	458,049	288,030	190,650.28	53,406.19	244,056.47	22,231.35
1851	942,097	579,156	218,660.17	66,961.07	285,621.24	23,480.38
1852	1,074,699	800,038	416,954.69	66,840.80	483,795.49	27,732.32
1853	1,215,990	888,695	582,654.77	79,034.31	661,689.08	29,398.75
1854	1,218,498	907,354	686,705.97	76,186.97	762,892.94	29,336,91
1855	1,396,493	1,105,263	770,697.92	77,882.87	848,580.79	27,033.55
1856	1,449,011	1,169,453	725,956.85	74,542.10	800,498.95	36,030.57
1857	1,595,508	1,275,988	725,677.79	78,093.68	803,771.47	40,558.82
1858	1,622,670	1,323,804	742,407.37	115,854.51	858,261.88	37,094.20
1859	1,699,101	1,372,109	840,928.42	120,141.34	961,069.76	35,860.31
1860	1,651,416	1,356,687	987,508.07	102,265.47	1,089,773.54	38,693.76
1861	1,385,377	1,183,570	842,891.23	79,707.63	922,598.86	30,292.60
1862	1,190,193	981,728	695,414.11	63,430.43	758,844.54	21,628.66
1863	1,104,935	884,377	828,597.53	67,471.00	896,068.53	25,077.95
1864	1,224,572	1,000,500	1,419,895.01	107,939.22	1,527,834.23	24,932.00
1865	1,200,652	1,022,740	1,532,653.79	84,685.52	1,617,339.31	26,727.30
1866	1,579,721	1,297,047	1,227,883.58	116,652.24	1,344,535.82	50,285.40
1867	1,307,528	1,030,235	923,906.18	115,702.68	1,039,150.93	55,660.63
1868[1]	1,267,420	987,627	851,532.81	110,144.89	961,677.70	46,239.34

[1] No figures given in reports for 1869–70.

EARNINGS ON THE SCHUYLKILL NAVIGATION UNDER THE READING RAILROAD MANAGEMENT.

Year ending Nov. 30.	Schuylkill Canal, Tolls on Merchandise.	Schuylkill Canal, Tolls on Coal.	Schuylkill Canal, Miscellanous Receipts.	Schuylkill Canal, Total Earnings.	Schuylkill Canal, Transportation Line, Freight on Merchandise.	Schuylkill Canal, Transportation Line, Freight on Coal.	Schuylkill Canal, Transportation Co., Miscellaneous Receipts	Schuylkill Canal, Transportation Line, Total Earnings	Total Earnings from Canal Business.
1871	$102,086.34	$932,222.77	$42,770.01	$1,077,079.12	$25,105.48	$480,205.67	$17,131.06	$522,442.21	$1,599,521.33
1872	105,454.20	503,004.56	53,081.65	661,540.41	38,501.01	404,206.73	22,773.41	465,481.15	1,127,021.56
1873	107,978.50	626,866.95	54,353.89	789,199.34	49,078.26	402,707.04	604.59	452,389.89	1,241,589.23
1874	92,874.52	563,830.00	48,942.88	705,647.40	42,601.30	380,643.59	....	423,244.89	1,128,892.29
1875	72,016.65	619,547.74	46,095.17	737,659.56	33,134.00	368,769.51	....	401,903.51	1,139,563.07
1876	67,910.94	446,568.91	49,795.52	564,275.37	8,199.88	271,892.11	....	280,091.99	844,376.36
1877	67,991.88	428,559.76	53,204.00	549,775.64	4,476.84	379,256.81	....	383,733.65	933,489.29
1878	53,506.35	573,116.15	49,307.88	675,930.38	5,247.12	257,200.69	....	262,147.81	938,378.19
1879	61,974.66	359,704.42	44,321.57	466,000.65	9,214.36	319,973.38	....	329,187.74	795,188.39
1880	52,284.23	475,096.38	45,752.46	573,133.07	17,925.78	226,921.33	....	244,850.11	817,983.18
1881	52,587.24	485,251.52	45,888.25	583,727.01	16,615.30	258,763.90	....	275,379.29	859,106.30
1882	50,663.60	423,725.86	44,298.29	518,687.75	5,842.05	250,812.36	....	256,654.41	775,342.16
1883	48,407.64	455,832.56	44,043.93	548,284.13	3,768.58	301,949.41	....	305,717.99	854,002.12
1884	42,947.49	308,165.89	30,649.50	381,762.88	3,791.03	276,076.15	....	279,867.18	661,630.06
1885	41,554.20	244,702.17	21,334.28	307,590.65	2,067.97	257,826.97	....	259,894.94	567,485.59
1886	37,944.02	219,586.91	17,547.47	275,078.40	380.89	278,718.23	....	279,099.12	544,177.52
1887	21,490.72	115,371.04	15,389.53	152,251.29	434.47	151,211.59	....	151,646.06	303,897.35
1888	....	....	....	172,632.73	....	....	....	....	See Fourth Column
1889	....	....	....	122,851.33	....	....	....	....	
1890	....	....	....	81,222.90	....	....	....	....	....
1891	....	....	....	No Entry	....	....	....	....	....
1892	....	....	....	55,092.49	....	....	....	....	....
1893	....	....	....	44,301.77	....	....	....	....	....
1894	....	....	....	41,285.93	....	....	....	....	....
1895	....	....	....	43,959.82	....	....	....	....	....
1896	....	....	....	53,404.45	....	....	....	....	....

Page 239, Reading report for 1871, gives a brief summary of the results of operation July 11 to November 30, of the year 1870.

EXPENSES ON THE SCHUYLKILL CANAL UNDER THE READING RAILROAD MANAGEMENT.

Year ending Nov. 30.	Schuylkill Canal, Expenses of Operation and Taxes, etc., Repairs.	Receipts over Cost of Working. (For receipts see another table).	Taxes and Other Charges.	Result of Operation of the Canal.	Schuylkill Canal, Transportation Line Expenses. (For receipts see another table).	Result of Operation of Schuylkill Transportation Line.	Result of Operation of Schuylkill Canal and Schuylkill Navigation Line.
1871	$330,437.69	$746,641.43	$728,379.29	Gain $18,262.14	$556,150.60	Loss $33,708.39	Loss $15,446.25
1872	299,836.97	361,703.44	676,333.93	Loss 314,630.49	502,116.18	Loss 36,635.00	Loss 351,265.52
1873	247,554.17	541,645.17	675,713.78[1]	Loss 34,068.61	479,926.50	Loss 27,536.61	Loss 61,605.22
1874	231,043.10	474,604.30	674,487.08	Loss 199,882.78[2]	459,792.62	Loss 36,547.73	Loss 216,927.94
1875	197,791.84	539,867.72	669,937.50	Loss 130,069.78	397,550.18	Profit 4,353.33	Loss 125,716.45
1876	137,793.01	426,482.36	671,916.56	Loss 245,434.20[3]	284,471.30	Loss 4,379.31	Loss 246,853.27
1877	126,470.80	423,284.84	671,941.56	Loss 248,656.72	308,831.92	Profit 74,901.73	Loss 173,754.99
1878	142,178.76	533,751.62	672,076.56	Loss 138,324.94	222,805.38	Profit 39,642.43	Loss 98,682.51
1879	152,072.31	313,928.34	647,985.90	Loss 334,057.56	295,210.94	Profit 33,976.80	Loss 300,080.76
1880	169,952.32	403,180.75	627,669.81	Loss 224,489.06	211,485.35	Profit 33,364.76	Loss 191,124.30
1881	171,873.60	411,853.41	573,092.61	Loss 161,239.20	261,811.06	Profit 13,568.23	Loss 147,670.97
1882	203,592.62	315,095.13	586,984.31	Loss 271,889.18	258,437.80	Loss 1,783.39	Loss 273,672.57
1883	195,826.82	352,457.31	623,959.38	Loss 271,502.07	286,317.67	Profit 19,400.32	Loss 252,101.75
1884	181,895.78	199,867.10	627,979.06	Loss 428,111.96	272,055.88	Profit $7,811.30	Loss 420,300.66
1885	137,369.26	170,221.39	614,512.44	Loss 444,291.05	258,648.58	Profit 1,246.36	Loss 443,044.69
1886	156,372.52	118,705.88	596,320.43	Loss 477,614.55	291,321.81	Loss 12,222.69	Loss 489,837.24
1887	69,478.33	82,772.96	372,265.48	Loss 289,492.52	163,348.06	Loss 11,702.00	Loss 301,194.52
1888	50,199.08	Entries cease.	49,022.65[4]	Entries cease.			
1889	44,780.03		33,480.80[4]				
1890	41,659.70		21,986.39[4]				
1891	No entry.		No entry.				
1892	37,806.01		9,196.56[4]				
1893	37,000.25		9,782.52[4]				
1894	41,635.28		9,196.56[4]				
1895	37,435.18		9,236.18[4]				
1896	40,103.12		9,236.18[4]				

[1] The Canal is credited in this year with $100,000 as share of a damage suit. This is not here noted. The charge would then be $575,713.78.

[2] From this should be subtracted 819,502.57 due the Canal, under an award in settlement of damages. Making real item here $180,380.21,

[3] Less credit in a law suit ($2,960.24) $242,473.96.

[4] Rental charge for the year.

Chapter VII.

SUMMARY.

In all of the waterways, the history of which has been reviewed, the main trade has been coal. The general trade has been negligible from the standpoint of profits, with the exception, perhaps, of the trade in iron ore on the Lehigh and Morris Canals and the miscellaneous trade on the Schuylkill Navigation.

The canals fall into two classes—the Morris and the Delaware and Hudson; and the Lehigh, the Schuylkill, and the Delaware Division. The first group involved carrying all through freight over heights of land intervening between the ends of the waterways. The latter group takes the heavy freight offered downward only. These groupings also correspond to the availability of the canals as trade routes, in the past and in the future. From this point of view the situation of the Morris Canal is the least favorable. The physical difficulties to be overcome place it at a permanent disadvantage in comparison with the other routes, notwithstanding the location on the line from the coal fields to New York. In the present state of mechanical development the extended use of the inclined plane, even if the water supply could be increased sufficiently to support an enlarged canal, seems to be out of the question.

The Delaware and Hudson, except that inclined planes are not necessary, labors under similar disadvantages, but its ability to handle a large traffic is proved by its history. Its operation has been found unprofitable under present conditions, however, and the railroad interests in control do not look upon its rehabilitation as a practical matter. This is also the case with the Schuylkill route, though in this case there is no summit level to be overcome.

The Lehigh and Delaware Division Canals, now under one ownership, are in a more favorable position. The physical conditions are more advantageous, and it is also to be noted that, unlike the other two, they are held by a company in which the development of the canals would not merely mean a supplemental outlet to a market already reached by its railroad holdings, but an independent access to markets now reached through agencies furnished by other transportation companies. These canals also have proved in the past their ability to handle traffic.

The problem of successful maintenance of a coal-carrying canal is the same as for other transportation routes—the securing of tonnage. This is difficult at present because of the high local rates charged on the railways, which might prove feeders to the waterways. As a result, the canals find it difficult to make a competitive rate such that they can compete with rail carriage on the through trade. The high local rates on coal shipped to the canals form so large a part of the cost of carriage to market that the canals must work at a peculiar disadvantage, unless they can supply the tonnage directly from their own coal mines or over railroads with which they are allied. When the competing railroad companies are also coal mine owners, it is evidently against their interests to establish local rates which would divert traffic from their own to the rival transportation interests of the canals. One of the prerequisites of successful operation of these canals is therefore the ability to command favorable railway connections or to deliver the coal directly to market.

Another disadvantage of canals is the necessity of transshipment, especially when the cargoes on the canals are of small size. Where the coal must be loaded from a railroad to a canal-boat, and later from a canal-boat again to a railroad car, the incident expense greatly cuts into the ability of the canal to compete. Where the second transhipment can take place into large barges, the disadvantage is not so great, especially as the canal-boat will have the ability to come directly alongside, and wharfage charges can be avoided.

The inability to market products during the winter is a permanent limitation on the use of canals. Where the business must for months be transferred to the railroads there can naturally not be the continuity of business relations that is so much to be desired. This is another reason why the operation of the canals on an independent basis rather than as supplemental to the railroads involves a handicap for them.

The technical problem of reducing the fixed charges of canal maintenance and the delays of lockage is also important in determining whether the canals can again be made available. The fixed charges of attendance of lockmen and the repairs of locks form the largest single item of expense on an average canal of 100 tons to 150 tons capacity. This renders the decrease of the number of locks an important factor in cutting down cost of operation. Modern engineering is making possible the use of locks of much greater height than those now in place on canals of medium size, and if such could be introduced with profit, adopting a sixteen or twenty-foot lift where now eight or ten-foot locks are in use, an important saving could be made.

Locks of higher lift would also mean a great economy in time, for it takes only a small increase of time to fill or empty a lock twice the usual present height. The great waste of time in lockage at present is consumed in getting the boat into the lock, not in raising or lowering the boat. The loss occasioned in checking a boat which is going into the lock too rapidly, or pulling it into the lock by hand or by winches, or in starting one lacking momentum, consumes many times the time necessary to do the actual work of raising and lowering. Where short lift locks are used the time spent in lockage is often as great as the entire period spent in actually traversing the prism. Higher locks would therefore mean a decrease in the personnel and equipment necessary to operate the canal as well as increased earnings on the capital invested in boats, due to the increased ability of each boat to take produce to market.

The most decided advantage of a canal is in the low cost of moving freight. Where speed is not an essential, as in the heavy and rough products, this may prove quite sufficient of itself to overcome disadvantages which would otherwise make operation unprofitable. The present actual cost of moving freight—exclusive of lockage—on a 100-ton barge canal is somewhat less than one-half cent per ton per mile. If the barge is increased in size, the cost per ton mile is more than proportionally less.

Where the fixed charges of a canal are low, this advantage in towing cost becomes a very important feature. A canal whose fixed charges and towing expenses with barges of 100 tons capacity, on a freight total of 250,000 tons, give a ton mile cost of one and one-half cents, would give a ton mile cost of one cent per ton mile on 500,000 tons and three-quarters of a cent per ton mile on 1,000,000 tons. Increase in the size of the barges, decrease in the number of locks, or in the cost of towage, would, of course, further decrease ton mile cost. In the latter item experience with electric traction in Europe shows that there important savings can be made over animal power. Towing from the bank of canals of the character under discussion has proven less wasteful of power than towing by tugs. Further, the distinct advantage is gained that it is accompanied by less washing of the banks. These reasons also set the profitable limit of speed, even when mechanical traction is introduced, at four to six miles an hour.

The Morris Canal seems to be handicapped to such a degree that its abandonment may be accepted as final. Under present conditions the operation of the Delaware-Hudson route, once an important avenue of trade, has been found unprofitable, as already indicated, and there is no prospect of its further use in the near future. The same is true of the Schuylkill Canal. Whether these two must be considered as permanently abandoned is, however, by no means clear. The Schuylkill Canal has carried as high as 1,699,101 tons per season, the Delaware and Hudson 1,991,870. In neither case did this total reach the capacity of the routes at the time, and with modern improvements the ability to handle freight could be almost indefinitely extended. The conditions on these routes are not essentially dissimilar from those on the Lehigh-Delaware waterway, the only one upon which attempts to introduce modern methods of traction are now being made.

Of the coal canals discussed, the only one now in operation throughout its whole length is that furnishing an outlet by the Lehigh-Delaware route. This canal still carries a coal traffic of over 200,000 tons. During the summer of 1907 experiments were undertaken on the upper section with the object of finding whether mechanical traction can be introduced at a profit. Two experimental sections of two miles each were installed. One section is operated by an electric device of the American Adhesion Traction Company; the other by a modification of the Lehigh Company's electric mine locomotive. All the traffic on both of these sections is handled exclusively by these machines, which run along the line of the old towpaths. They handle the traffic fairly well, and the expense of operation is less than that of animal power. Whether the fixed charges on the investment will overbalance this advantage cannot be stated as yet because of the short time in which the experiment has been in operation. Whether the canals can again prove themselves able to furnish a profitable outlet for the coal trade depends upon the success of experiments of this nature and modifications to cut down the fixed charges, such as are mentioned above.

If the coal canals can again prove themselves able to deliver freight at the tidewater wharves on terms equal to the rates offered by the railroads, it would seem that a profitable business is assured, even under present conditions.

The following reasons justify this conclusion:

(1) The Delaware and Hudson, Lehigh-Delaware and the Schuylkill Canals are all able to reach markets in large cities (Philadelphia and New York) directly. For a large part of the trade no transshipment is necessary, the chief problem being therefore to get the coal to the upper portion of the canals on equal terms with the railroads. If that is done, it seems possible that present improvements in water transportation may counterbalance the increased cost to the canal due to the necessary transhipment at the point of origin.

(2) If coal can be brought economically to the tidewater cities, even under present conditions, an important coastwise trade can be developed. This would necessitate transhipment to larger coal barges, but that charge could be borne without destroying profits. That this is the case is proven by the fact that the Reading Railroad finds it profitable to tranship coal at Port Richmond from its cars to coal barges which it sends through the Chesapeake and Delaware Canal to the Baltimore, Washington and Norfolk markets. A profitable business has thus been built up in spite of the canal tolls involved on the Chesapeake and Delaware Canal. If the Schuylkill and Lehigh Canals could bring to Philadelphia, and the Delaware and Hudson to New York, the anthracite from their respective districts, it would seem that a similar coastwise market would be open to their exploitation. A belief that such a development is possible is indicated in the action of the Lehigh Coal and Navigation Company at the beginning of 1908 in the purchase of a number of coal barges to be used in connection with its canal shipments for the supply of this coastwise trade.

The possibilities of developing these markets would be greatly increased should the present movement to improve the coastwise waterways be attended with success. The trade to the south would be on a better footing because of the increased capacity of the boats into which the transshipment could be made, and because of the abolition of canal tolls. In the same way the shipments of the Schuylkill and Lehigh Navigation to New York by the Raritan would be facilitated. At present the Pennsylvania Railroad interests controlling the Delaware and Raritan route maintain the charges at such a figure that no competition can be given to the railroads by the canal companies on the through coal trade to New York. Were the tolls abolished and the channel widened this market, like that to the south, would be open to exploitation by those delivering coal by water. The completion of the Cape Cod Canal would furnish in lesser degree a similar aid to the Delaware and Hudson in its shipments to Boston and other New England ports to the north.

The answer to the question of the future availability of the coal canals is therefore a double one. In the case of the Morris Canal future availability seems highly improbable. In the case of the four others the problem is a technical one —whether the improvements of modern engineering can make their operations so economical as to make their use as a supplement to the railroads in carrying low-class freight a profitable one. Physical ability to handle traffic is proved by their history. Availability of tonnage, through the granting of competitive rates on the feeding lines, and economy of operation, are problems to be determined by the community of railroad and canal interests and by improvements in engineering.

BIBLIOGRAPHICAL NOTE.

The documents used in the preparation of this monograph were found chiefly in the collections of the Library of Congress in Washington; the Lenox and Astor Libraries in New York; the libraries of the University of Pennsylvania, of the Pennsylvania Historical Society; the Philadelphia Public Libraries in Philadelphia; and the Library of the University of Wisconsin and the Wisconsin Historical Society at Madison, Wisconsin. In addition valuable resources in the possession of the companies now controlling the various properties were used. To all these organizations thanks for the courtesies shown are due.

The material dealing with the coal carrying canals is nowhere available in satisfactory condition, and it has been found impossible in several cases to obtain complete sets even of the official reports issued by the companies. The fragmentary character of the material available is in some instances remarkable. The public libraries as a rule have collections which are evidently the result of merely casual contributions. This is to be expected. It is more surprising to find how little is known by several of the controlling interests concerning the history of the properties which they own. In one instance the officials showed willingness to cooperate, but when asked for the annual reports during the period when the enterprise was in active operation declared that they were entirely ignorant of the fact that such reports had ever been published! Another company has a collection giving a surprise of a different sort. One of the directors through a considerable period collected the annual reports of all the coal carrying companies, making a library which is the most valuable single collection to which access was obtained.

In addition to the incompleteness of the files of reports in the various libraries, the reports themselves leave much to be desired. This is especially true in later years. The early reports were intended to be full expositions of the work accomplished and policy pursued by the company. Details of traffic and expenditure are given, contracts entered are published in full and the prospects and difficulties of operation are recounted. The later reports omit all detailed information as to character of traffic, expenses of operation, alliances with other corporations and the like. From the seventies on in general they become little more than balance sheets, from which it is impossible to see what the real conditions are.

Even when traffic statistics are given they are often compiled in a way that makes effective comparisons impossible. Part of the traffic is given in long, part in short tons, the general traffic in lumber is expressed in varying terms in the same series of reports, in some years all by cubic feet, then parts by board measure, thousands (singles), cords, and finally all in tons. General traffic, too, is variously entered, barrels, casks (whiskey), boxes, tons, pounds, bushels and head (livestock) all appearing in the same list. This criticism applies especially to the Delaware Division Canal under state management. Accurate discussion of development of traffic must be dropped for generalizations in such cases.

The vicissitudes through which the various properties have gone add to the difficulty of treatment. Bankruptcies, leases, reorganization and sales introduce new methods of presenting the reports and make it difficult to follow out the development of the various phases of company life. Especially is this true when the canal companies either develop railroad enterprises which come to be the more important branch of the corporate interests or become merged with rival transportation companies. Thus, after the Schuylkill Navigation is absorbed by the Reading, the Morris Canal by the Lehigh, or after the canal company becomes chiefly a railroad company, as in the case of the Delaware and Hudson, the canal interests are so overshadowed by the railroad that only the bare outline of the subsequent history can be given. This is usually justified by the relative lack of importance of the canal interests, but the abrupt ending of information is none the less unsatisfactory. This is especially the case with the Schuylkill Navigation, from which traffic was purposely diverted by the Reading with the intention of using the canal as a "dripping pan" to catch only that trade which could not be handled by the railroad. The same criticism applies to the reports of the Delaware and Hudson after 1867, when the company's railroad interests became predominant, and to the Morris Canal after its purchase by the Lehigh Railroad. There is therefore but one of the companies, the Lehigh Coal and Navigation Company, in which the interests of the canal as a transportation agency are easily followed down to the present. Even in this case it may be noted that the fact is due to the financial difficulties into which the company fell which made it dispose of its railroad holdings by a long lease to another corporation.

BIBLIOGRAPHY.

LEHIGH CANAL.

Niles Register, XXX, August 12, 1826, 415; XXXI, December 30, 1826.

Reports of the Lehigh Coal and Navigation Company, 1828-1865, 1867-1907.

An act to Improve the Navigation of the River Lehigh, and An Act to Incorporate the Lehigh Coal and Navigation Company, 1818.

Report of the Engineers of the Lehigh Coal and Navigation Company, Conrad, 1826, no place.

Hazard's Register, Volume II, Samuel Hazard, Philadelphia, Geddes, 1840, p. 114 *et seq.*

History of the Lehigh Coal and Navigation Company, 1840, no printer. Hazard's Register, Volume III, p. 80 *et seq.*, quotes a portion of above pamphlet.

The Canals of Pennsylvania, T. B. Klein, 1901, Ray (State Printer).

Laws of Pennsylvania, Vol. I, 322; Vol. III, p. 311; Sup. Vol. V, p. 100; Vol. VI, p. 180; Vol. VII, p. 86, also p. 494. (Incorporation.)

Report of the Committee of the Senate of Pennsylvania on the Subject of the Coal Trade, S. J. Packer, Chairman, Harrisburg, Welsh, 1834.

Report of the Committee to whom was (*sic*) referred the Memorials of a number of the citizens . . of Pennsylvania praying that the same rates of toll may be charged on the Delaware Division of the Pennsylvania Canal as are charged by the Lehigh Coal and Navigation Company for the use of the Lehigh Canal, etc., Livingston, Chairman, Harrisburg, Welsh, 1832.

Counter Report of the Minority of the Committee to whom was [*sic*] referred the Memorials of a number of the citizens . . of Pennsylvania praying that the same rates of toll may be charged on the Delaware Division of the Pennsylvania Canal as are charged by the Lehigh Coal and Navigation Company for the use of the Lehigh Canal, etc., Kerlin, Harrisburg, Welsh, 1832.

Navigation of the Lehigh, Proceedings of the convention held at Allentown, May 21, 1832.

The Proceedings of a Convention of Delegates elected by the citizens of the districts interested in the connection of the Susquehanna and Lehigh Rivers by a Canal. Conyngham Town, 1832.

Circular, presented to the Senate by Josiah White, no printer, no date.

To the Committee on Corporations of the Senate, Josiah White, 1832, no printer.

To the Members of the Legislature, Circular by A. Abbott, transmitted by Josiah White and Erskine Hasard, no date, no printer, 1832-5 (?).

To the Members of the Legislature, Circular by S. D. Ingham, Harrisburg, 1835, no printer.

Correspondence between the Lehigh Coal and Navigation Company and the Beaver Meadow Railroad and Coal Company, no date, no printer, 1835 (?).

Opinion: On several acts of Assembly relating to the Lehigh Coal and Navigation Company, Philadelphia, Harding, 1835.

Memoir of Josiah White, R. Richardson. Philadelphia, Lippincott, 1873.

DELAWARE DIVISION.

Niles Register, XXXII, August 4, 1827, 373.

Report of the Canal Commissioners of the Commonwealth of Pennsylvania, accompanied with Documents, Harrisburg, 1828, dated 1827.

Report of the Canal Commissioners of the Commonwealth of Pennsylvania, Harrisburg, 1828. Similar, 1829-58.

First Annual Report of the Delaware Division Canal Company of Pennsylvania, February 1, 1859. Similar, 1860-67.

Laws of Pennsylvania, 1826-7, p. 196-200, Act 95.

Hazard's Register, Vol. II, Samuel Hazard, Philadelphia, Geddes, 1840, p. 115; Vol. III, p. 85.

DELAWARE AND HUDSON CANAL.

Report of the Engineers of the Canal from the Hudson to the Lackawaxen, Philadelphia, Young, 1824.

Niles Register, XXIV, May 10, 1823, p. 144; XXV, November 1, 1823, p. 134; XXVIII, August 8, 1825, p. 356; XXX, January 22, 1835, p. 336; XXXII, July 14, 1827, p. 323; also, August 18, 1827, p. 406; XXX, June 3, 1826; p. 239; XXXV, October 25, 1828, p. 131, February 21, 1829, p. 433; XXXVII, October 24, 1829, p. 130, November 14, 1829, p. 178; XXXIX, January 22, 1831, p. 384; XL, July 2, 1831, p. 307; XLIV, April 20, 1833; XLVIII, March 28, 1835, p. 59.

Annual Report of the Board of Managers of the Delaware and Hudson Canal Company to the Stockholders for the Year 1825 (1826). Similar yearly 'to and including 1898 (1899).

Annual Report of the Board of Managers of the Delaware and Hudson Company to the Stockholders for the year 1900 (1901). Similar yearly to 1907.

Exposition of the Objects and Views of the Delaware and Hudson Canal Company, "Investigator," March, 1831, no printer.

Report of Convention held at Conyngham, July 4, 1833, also printed in Report of Committee of the Senate . . on . . the Coal Trade, Harrisburg, Welsh, 1834.

Copy of an Agreement between . . the Delaware and Hudson Canal Company and Wyoming Coal Association and of an Agreement between the Delaware and Hudson Canal Company and Pennsylvania Coal Company, New York, Bryant, 1853.

Memorial of the Excursion from New York to Montreal given by the Delaware and Hudson Company upon the . . opening of the New York and Canada Railway, New York, Baker & Goodwin, 1876.

Laws of Pennsylvania, Vol VIII, Ch. 5663, p. 429, supplementing a law of 1823, Ch. 5317.

Laws of New York, Ch. CCXXXVIII, p. 305, April 23, 1823 (Incorporation); Ch. CLXXIV, April 7, 1824 (Amendment).

MORRIS CANAL.

Niles Register, XXIII, September 14, 1822; XXV, December 6, 1823, p. 22; XXIX, September 10, 1825, p. 24, and October 1, 1825, p. 68, and November 5, 1825, p. 29; XXXVII, October 17, 1829, p. 124, also December 26, 1829, p. 277; XXXIX, January 8, 1831, p. 329; XL, April 30, 1831, p. 159, and August 6, 1831, p. 405; XLI, November 19, 1831, p. 225; XLIV, June 1, 1833, p. 222.

Report of the Commissioners appointed by the Legislature of New Jersey for . . exploring the route of a canal to unite the River Delaware near Easton with the Passaic near Newark, Morristown, Mann, 1823.

Annual Report upon the Morris Canal for the Year ending July 1, 1826, New York, 1826, William Davis. Similar yearly to and including 1832.

Report on the Origin and Increase of the Paterson Manufactories and the intended Diversion of their waters by the Morris Canal Company, John L. Sullivan, Paterson, 1828, no printer.

An answer to Mr. John L. Sullivan's Report to the Manufacturing Society of New Jersey, in a letter to The Morris Canal Company, Colden (?), New York, 1828, William Davis.

Refutation of Mr. Colden's Answer to Mr. Sullivan's Report, undated, no place or printer.

Report of the Joint Committee of Council and Assembly, Appointed to View the Morris Canal and Inclined Planes, Jersey City, December 13, 1828, no printer.

Letter to John Wurtz, Esq., with Case and Opinion by a Stockholder of the Morris Canal, undated, probably March, 1831, no printer.

Rules and Regulations of the Morris Canal, 1831, Jersey City, 1831, no printer.

Memorial to the Legislative Council and General Assembly of the State of New Jersey . . against the Morris Canal and Banking Company, no date, no place, probably 1831.

Charter of the Morris Canal and Banking Company and the General Acts of the Legislature in relation thereto. Jersey City, 1832.

An estimate of the Revenue which may be derived from the Morris Canal, Report to the War Department, 1823, General Bernard and Colonel Totten, New York, William Davis, 1827.

Report of a Joint Committee of the Directors and Stockholders of the Morris Canal and Banking Company, New York, 1832, Van Norden.

Documents Relative to the Negotiation for a loan to the Morris Canal and Banking Company, 1833, no printer.

A Brief View of the Important Relations of the Morris Canal with the Prosperity of the City of New York, "A Stockholder," New York, Van Norden (probably 1835).

Report of the President and Directors of the Morris Canal and Banking Company, New York, Van Norden, 1835. Similar 1836, 1845.

Rules and Regulations of the Morris Canal, 1835, New York, Van Norden, 1835.

To the Stockholders of the Morris Canal and Banking Company, Jersey City, Biddle, 1840.

The Prospects of the Morris Canal, undated, no printer, no author, (1845-6).

Report of the President and Directors of the Morris Canal and Banking Company of 1844, Sibell & Mott, New York, 1848. Similar, 1849-71.

Beauties of the Monopoly System of New Jersey, H. C. Carey, Philadelphia, Sherman, 1848.

A Further Supplement to the Act entitled An Act to Incorporate an Artificial Navigation between the Passaic and Delaware Rivers, 1849, no printer.

To the Stockholders of the Morris Canal and Banking Company, Seymour, New York, 1865. Similar, 1866.

Report of the President and Directors of the Morris Canal and Banking Company to the Stockholders, Jardine, Jersey City, 1867.

Rates of Freight and Tolls by the various Railroads and Canals to Tidewater, Oliver, New York, 1868.

Report of the Lehigh Valley Railroad, 1872-88.

Laws of New Jersey, 1823-6, p. 158-171, December 31, 1824 (Incorporation).

SCHUYLKILL CANAL.

Niles Register, VI, p. 152, April 30, 1814; XXVI, p. 252, June 19, 1824, p. 302, July 10, 1824; XXVII, p. 80, October 2, 1824, p. 258, December 25, 1824; XXVIII, p. 164, May 14, 1825; XXIX, p. 215, December 3, 1825; XXXIII, p. 182, November 17, 1827; XXXV, p. 331, January 17, 1829.

Address of the President and Managers of the Schuylkill Navigation Company to the Stockholders, Philadelphia, 1821.

Report of the President and Managers of the Schuylkill Navigation Company to the Stockholders, January 1, 1827, North Alley (Philadelphia ?) 1827. Similar, 1828-69.

Report of the Committee of the Senate of Pennsylvania on the Subject of the Coal Trade, S. J. Packer, Chairman, Harrisburg, Welsh, 1834.

An Address to the Stockholders of the Schuylkill Navigation Company in reply to a Pamphlet circulated by the Reading Railroad Company, Anon., Philadelphia, 1844, no printer.

Position and Prospects of the Schuylkill Navigation Company, Charles Ellet, Jr., C. E., Philadelphia, 1845, no printer.

The Reading Railroad Company, their Policy and Prospects, "Examiner," Philadelphia, Sherman, 1844.

Report of the Board of Managers of the Schuylkill Navigation Company on the improvement of the Schuylkill Navigation, S. W. Roberts, Philadelphia, Kite, 1845.

The Schuylkill Navigation Company, Anon., Philadelphia, Crissy & Markley, 1852.

Memoir of Josiah White, R. Richardson, Philadelphia, Lippincott, 1873.

Report of the Philadelphia and Reading Railroad Company, 1871-1882, 1883-5, 1888-96.

Report of the Receivers of the Philadelphia and Reading Railroad Company, 1882.

Report of the President of the Philadelphia and Reading, 1882.

Report of the President and Managers of the Philadelphia and Reading, 1886, 1887.

Report of the President and Managers of the Philadelphia and Reading Railroad Company to the Stockholders and Report of the Receivers, 1887.

Laws of Pennsylvania, 1812-1817, p. 257, Ch. 4057, March 8, 1815 (Incorporation); *Ibid.*, p. 320, Ch. 4158, February 8, 1816 (Amendment).

INDEX

Anthracite
  Early use, 1-6
  North field opened, 1
  South field opened, 2
  Use in war of 1812, 3
  Middle field opened, 4
  Efforts to market, 5, 8, 80
  Ark shipments of, 8, 13, 17, 128
  Regular shipments begun, 12
  Trade developed, 26

Banking privileges
  To Delaware and Hudson Canal Company, 75
  To Morris Canal Company, 107; surrendered, 114
Boats (*See also* Packet Boats)
  Combination for, 43
  On Lehigh, 51
  On Delaware Division, 70-71
  On Delaware and Hudson, 82, 91
  On Morris, 111, 114-5, 118
  On Schuylkill Navigation, 131 *et seq.*, 139

Canal interests wane
  Lehigh, 33 *et seq.*, 44-5, 47
  Delaware Division, 71 *et seq.* (*see also* Lehigh)
  Delaware and Hudson, 90 *et seq.*, 101
  Morris, 118 *et seq.*
  Schuylkill Navigation, 145
Civil War
  Lehigh Canal during, 36 *et seq.*, 41-3
  Delaware Division during, 71 *et seq.*
  Delaware and Hudson during, 87 *et seq.*
  Morris during, 117
  Schuylkill Navigation during, 142
Classes of the canals, 159

Delaware and Hudson Canal
  Object of, 7, 74
  Chartered, 75
  Banking privileges, 75
  Stock subscription, 76
  Construction, 76, 77
  Completion, 78
  Great prosperity, 1840-60, 81 *et seq.*
  Enlargement, 82 *et seq.*
  Controversy with Pennsylvania Coal Company, 88
  Expansion of interests, 90 *et seq.*
  Panic of 1873, 94
  Restriction of output, 98
  Future, 163
Delaware Division Canal
  Deficient size, 15, 44
  Poor construction, 17, 23, 61
  Interstate jealousies, 31, 61, 66
  Lease modified, 49
  Subsidiary to Lehigh, 60
  Begun, 60
  Water deficient, 61, 64, 66
  Small size, 63
  State management, 65
  Private management, 70
  Leased by Lehigh, 43, 73
  Enlarged, 72
  Relation to Morris, 116

Finances
  Lehigh Canal, 18, 22, 24, 31, 41, 47 *et seq*
  Delaware Division, 62, 64, 67-8
  Delaware and Hudson, 85, 87, 94, 99, 101
  Morris Canal, 111, 113, 118
  Schuylkill Navigation, 126, 129, 139
Future availability
  Difficulties of securing tonnage, 160
  Transshipment, 160
  Canal charges, 161
  Advantages of canals, 162
  Possibility of future use shown, 164
  Technical improvements, 165

General traffic
    Lehigh, 27-9, 34
    Delaware Division, 68
    Whiskey trade on, 70
    Delaware and Hudson, 80, 95, 96
    Morris, 120 *et seq.*, 124-5
    Schuylkill Navigation, 130, 135
Girard, Stephen, 4, 128

Hauto, G. F. A., 9, 11, 12, 19
Hazard, E., 9, 11, 12, 19

Lehigh Canal
    Early improvements, 7-8
    Lehigh Coal Mine Company, 7
    Charter, 10
    Method of early improvement 10
    Lehigh Navigation Company, 11
    Artificial freshets, 12, 14
    Lehigh Coal and Navigation Company, 13
    Incorporation, 13
    Early equipment and management, 13
    Transformed to slackwater navigation, 15
    Enlargement, 16
    Improvements above Mauch Chunk, 22-3
    Flood of 1840, 24
    Traffic, etc. (*see also* Tonnage, Tolls, and similar headings)
    Railroad expansion, 37-40
    Flood of 1860, 42
    Upper section abandoned, 42
    Delaware Division leased, 43
    Lease of Railroad holdings and other properties, 46-8
    Canal and mines returned to company, 49
    Future, 163

Monopoly
    By the Lehigh Company, 4, 19, 33, 96
    By Delaware Division, 64
    By Delaware and Hudson, 81
    In charter of the Morris, 106
    By Schuylkill Navigation, 129, 134
Morris Canal
    Small capacity, 31

Morris Canal—*Continued.*
    Early history, 104
    State control proposed, 104
    Survey, 105 *et seq.*
    Inclined planes, 106
    Speculation connected with, 106, 112
    Heights to be passed, 109
    Construction, 110
    Additional powers granted, 112
    Bankruptcy, 113
    Reorganization, 114
    Enlargement, 115
    Prosperity, 117-8
    Railway competition, 118
    Lease, 119
    Future, 162

New York
    Through coal trade to, 27, 50, 54, 111, 133, 141

Packet boats
    On Lehigh, 23, 30
    On Delaware Division, 68
    On Delaware and Hudson, 95

Railroad
    To feed Lehigh Canal, 15, 32
    Competition
        Lehigh, 33, 34, 45-6
        Delaware Division, 64, 65
        Delaware and Hudson, 90 *et seq.*, 99
        Morris, 118
        Schuylkill Navigation, 136
    Building
        Lehigh, 37-40, 43
        Delaware and Hudson, 83 *et seq.*, 90 *et seq.*
    To feed Delaware and Hudson, 79
Restriction of output
    By Delaware and Hudson, 98

Schuylkill Navigation
    Early history, 126
    Charter, 126

Schuylkill Navigation—*Continued.*
  Construction, 127
  Not originally a coal canal, 128
  Monopoly period, 129 *et seq.*
  Private operators on, 131
  Enlargement, 131 *et seq.*, 138 *et seq.*
  New York trade, 133
  Tolls and traffic, 134 *et seq.*
  Competition and combination, 136 *et seq.*
  Reorganization, 140
  Agreement with Reading, 142
  Lease, 145
  Reading's operation of the canal, 146
  Future, 163

Tolls
  On Lehigh, 14, 53, 54
  On Delaware Division, 52-4, 69, 72-3
  On Delaware and Hudson, 80, 82, 86, 97, 103
  On Morris, 111, 123
  On Schuylkill Navigation, 130, 134, 139, 144, 148 *et seq.*
Tonnage
  On Lehigh, 14, 25, 33-6, 50, 52, 55-9
  Combination of canal interests to secure, 43
  On Delaware Division, 68-9, 72-3
  On Delaware and Hudson, 80, 97, 103
  On Morris, 122, 124
  On Schuylkill Navigation, 130, 132, 134, 139, 143, 144, 147 149 *et seq.*

Water powers
  Lehigh, 30
White, Josiah, 9, 11, 12, 19
Wurtz, Maurice, 74, 77

UNIVERSITY

14 DAY USE
RETURN TO DESK FROM WHICH BORROWED
LOAN DEPT.
RENEWALS ONLY—TEL. NO. 642-3405
This book is due on the last date stamped below, or
on the date to which renewed.
Renewed books are subject to immediate recall.

FEB 10 1970 4 9	
REC'D LD	FEB 20 '70-2 PM

LD21A–60m-6,'69
(J9096s10)476–A-32

General Library
University of California
Berkeley

H31
.T4
no.21

174737